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KNOWLEDGE AND AWARENESS OF COMMON EYE DISEASES AMONG TRINIDAD  
AND TOBAGO POPULATION

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## **ABSTRACT**

### **Background**

Increased rates of avoidable blindness worldwide is becoming an alarming issue as many of the cases seen could have been avoided.

### **Aim**

The purpose of this study was to determine how knowledgeable the general population of Trinidad and Tobago are about common eye diseases in comparison to other countries.

### **Method**

A total of 230 study participants were randomly selected and interviewed using questionnaires. Demographics such as age, gender education were collected as well as information ascertaining the knowledge and awareness of participants of the common eye diseases being assessed.

### **Results**

Based on our results cataract has the highest awareness rate (98.3%) followed by glaucoma (80%) and night blindness (50%). From a total of 230 participants 40% correctly identified knowing it was damage to the nerve at the back of the eye with 14% stating that they were unaware. Majority of responses (12.2%) stated that strabismus is a non-parallel alignment of the eye with 8.7% stating it was a deviation of the eyes. Keratoconus was correctly identified as a

thinned cornea that bulges into a cone shape by 4.8% of individuals while 11.7% stated that a refractive error was a result of abnormal bending of light. Majority of persons stated that a cataract was a white opacity over the cornea (83%) with 56% of the subjects stating it was an opacity of the lens. Finally, night blindness was identified as a vitamin A deficiency by 24.8% of respondents with 8.7% of respondents stating it was difficulty seeing in low lighting or at night.

### **Conclusion**

To conclude results obtained from the study showed that there was in fact a lack of awareness and knowledge within the population.

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## CHAPTER ONE

## **1.0 INTRODUCTION**

Globally, over 2.2 billion people have visual impairment, of which 1 billion could have been prevented<sup>1</sup>. This implies that a large percentage of causes of blindness are avoidable. Glaucoma, cataract, diabetic retinopathy, trachoma, refractive error and keratoconus are some of the leading causes of blindness worldwide<sup>1</sup>. Poor awareness and knowledge of these conditions and their complications could hamper early detection and management. Creating awareness of these conditions could aid in early treatment and reduction of burden of visual impairment. There is no recorded data on the awareness and knowledge of these conditions among Trinidad and Tobago population. Therefore, this study was done to determine the level of knowledge and awareness of some common ocular conditions among Trinidad and Tobago population to compare with the global findings. This chapter will explain the basic outline of the study including the aim, objectives, rationale, significance, and limitations.

### **1.1 Background of study**

The world health organization (WHO) defines blindness as persons presenting with a visual acuity worse than 3/60.<sup>1</sup> There are over 2.2 billion people who have a refractive impairment of which 1 billion of the cases could have been avoided. Of the 1 billion this includes persons with moderate or severe distance sight impairment due to refractive error, cataract, glaucoma, or corneal opacities. Uncorrected refractive errors and cataracts according to WHO are the leading causes of blindness worldwide.<sup>1</sup>

As the world's population ages, the prevalence of cataract increases. In 2002, around 17 million people suffered from reversible blindness due to cataract. This figure was presumed to reach 40

million by 2020. <sup>2</sup>There are over 94 million persons blind due to cataract which exceeds the proposed epidemiological figure of 40 million (Chan et al (2013)). <sup>2,3</sup>

The WHO concluded that globally there are 88.4 million blind due unaddressed refractive error, 7.7 million as a result of glaucoma and diabetic retinopathy being the cause of blindness in 3.9 million. <sup>3</sup> WHO reported that night blindness affects 5.2 million preschool-age children and 9.8 million pregnant women globally. <sup>3</sup> The incidence and prevalence rates for keratoconus and strabismus vary widely. For instance, a long-term study conducted in the US estimated that 54.5 individuals per 100,000 individuals were diagnosed with keratoconus <sup>4</sup> .Also in another global study by Hashemi et al (2019) to determine the prevalence of strabismus concluded the estimated prevalence of strabismus was 1.93%. <sup>5</sup>

Braithwaite et al (2013) in a study done in Trinidad and Tobago reported uncorrected refractive error as the leading cause of moderate and severe vision impairment within the population significantly from ages five years old and above. <sup>6</sup> They also found the prevalence of refractive errors in adults over the age of forty to be myopia (19.2%) and hypermetropia (45.7%).<sup>7</sup>

In a retrospective study of causes of visual impairment and use of low vision devices in the low vision clinic in Trinidad and Tobago done by Joshi et al (2020) it was concluded that glaucoma was the major cause of low vision and blindness followed by diabetic retinopathy at the low vision clinic. <sup>8</sup>

Another study done by Braithwaite et al (2013) on prevalence, causes and risk factors for presenting impairments in adults over the age of 40 in Trinidad and Tobago concluded a prevalence rate of glaucoma to be 31.7%, cataract 28.8% and diabetic retinopathy with a prevalence of 19.1%.<sup>9</sup>Other causes of blindness in Trinidad include keratoconus.



As it pertains to awareness of common eye diseases a study done in Ethiopia to assess knowledge regarding cataract and associated factors among adults concluded that 67.2% of participants were aware of cataract which accounted for over half the participants. The study also concluded that a higher level of education, income and having previous eye examination and a family history of cataract were factors that contributed to persons being aware of some of the diseases. <sup>10</sup>Another study (Sultan et al, 2019) to evaluate the knowledge and awareness of the Saudi Arabian population based on old aged related diseases such as glaucoma and cataract showed similar findings in that a great degree of the population were aware of the presented diseases. The study concluded overall participants had good knowledge about the diseases, 84.1% of persons aware of cataract, 57.2% about diabetic retinopathy and 71.1% glaucoma. <sup>11</sup>

Also, a study conducted on knowledge and awareness of age-related eyes diseases in Iran (Katibeh et al, 2014) concluded that while persons were knowledgeable about some of the common eye diseases such as cataract and diabetic retinopathy, they lacked knowledge about glaucoma. The authors also stated that men, illiterate persons and persons without health insurance were reported to be less informed as opposed to women. <sup>12</sup> This comes as no surprise as many believe women tend to be more aware, well-educated and proactive when it comes to their health in comparison to men.

Haddad (2017) study in Jordan to assess the level of awareness of the population to common eye diseases showed that the population had an overall high awareness of the diseases. For example, awareness of diabetic retinopathy was 37.3% with 40.3% reporting risk factors from systemic disease, 46% of individuals reported that Diabetic retinopathy was a blinding disease while 37.4% knew it could be prevented, 33.4% knew it could be treated. <sup>13</sup>

Most people in Trinidad would prefer to visit an eye clinic only when they assume they may have need for spectacles and this could be due to lack of knowledge about other eye diseases. This allows for diseases to go undiagnosed and untreated leading to different forms of vision impairment. Studies on awareness, and knowledge have been done in other places. No studies have been done in Trinidad and Tobago. There is therefore a need to assess the level of knowledge and awareness of the Trinidad and Tobago population regarding this condition. Therefore, this study was done to determine the level of awareness and knowledge of the common ocular conditions among Trinidad and Tobago population.

## **1.2 Statement of the problem**

In a country where systemic diseases such as diabetes and hypertension are so prevalent it is important that the population be educated. Diabetics are at risk of developing diabetic retinopathy while hypertension increases the risk of patient developing CRVO and even glaucoma. These are serious conditions that if not detected and treated in the early stages can result in vision loss which unfortunately occurs regularly due to lack of knowledge leading to persons having their eyes examined only when a problem arises. Studies have been conducted in other parts of the world. No study has been done in Trinidad and Tobago. There is a need to do this study in order to understand where Trinidad and Tobago stand in the level of knowledge of these common eye conditions.

### **1.3 Aim of the study**

The purpose of this study was to determine how knowledgeable the general population of Trinidad and Tobago are about common eye diseases in comparison to other countries.

### **1.4 Objectives**

1. To determine the demographical distribution of the knowledge and awareness of the conditions
2. To assess the knowledge and awareness of the risk factors of the eye diseases
3. To determine factors that could influence knowledge and awareness of eye diseases
4. To evaluate the knowledge and awareness of the management of the eye diseases

### **1.5 Research questions**

0. What is the level of knowledge of Trinidad and Tobago population concerning these common ocular conditions?
1. What is the demographical distribution of the knowledge and awareness of the ocular conditions?
2. What is the level of knowledge and awareness of the general population concerning risk factors associated with these conditions?
3. What factors influence the knowledge and awareness of these conditions?
4. Are individuals aware on how such eye diseases are treated or managed?
5. What is the level of awareness and knowledge of the population concerning management of these condition?

## **1.6 Significance of study**

- Findings from this study can help develop strategies and programs that will help reduce the prevalence of blindness in Trinidad
- It can also serve as a baseline for further research
- This study will also highlight to the primary eye care professionals' areas where more awareness needs to be made and which demographic should be targeted.
- It would help the government make a more proactive approach in educating the general population

## **1.7 Limitations**

Conducting the survey via questionnaire could impact the responses of the participants as they may feel pressured to get the answer correct or even feel ashamed for not having any previous insight to the information being asked and thus could lead to the questionnaire not being completed.

Small sample size which cannot be generalized.

## **1.8 Delimitation of the study**

The study is delimited to only Trinidad and Tobago population

## **1.9 Definition of terms**

1. Refractive error- occurs when the eye cannot clearly focus the images from the outside world. Usually results in blurred vision,

2. Glaucoma- A condition in where there is a build-up of pressure in the eye leading to damage of the optic nerve.
3. Diabetic retinopathy- A complication caused by diabetes resulting in leaky blood vessels that if left untreated can lead to blindness.
4. Cataract – Clouding of the lens in the eye usually as a result of age, trauma and in some cases medication.
5. Strabismus- Also known as crossed eyes. A condition in which the both eyes do not align and look in the same direction.
6. CRVO- Central retinal vein occlusion, is a condition in which the vein of the retina becomes blocked or occluded.
7. Knowledge- Information acquired through experience or education
8. Awareness- Knowledge or perception of a situation or fact

## **CHAPTER TWO**

### **2.0 Literature Review**

#### **2.0 Introduction.**

This chapter identified and subsequently reviewed twenty studies done previously in different parts of the world with the fundamental aim of determining trends in awareness and knowledge on common eye diseases in different populations. The studies were compared based on the study objectives.

## **2.1 Awareness of common eye diseases**

Various studies conducted in Nepal (Shrestha et al, 2018), Bangladesh (Islam et al, 2015) and Ethiopia (Alemu et al, 2017) showed that there is limited knowledge and awareness about some ocular conditions.<sup>14,15,16</sup> Conversely, there is also a heightened awareness for particular diseases.

### Cataract awareness

Shrestha et al (2018) conducted a study on 1834 participants in Nepal to determine the awareness and knowledge of eye health and diseases in eight village districts reported. The awareness of cataract was found to be 74.6% among the population.<sup>14</sup> Also, Islam et al (2015) recorded a cataract awareness of 91.0% out of 3104 participants in the study. Studies in India (Pallerla et al, 2020) and Iran (Katibeh et al, 2014) on 782 and 1084 participants respectively reported 81.5% and 82.9% cataract awareness respectively. In contrast, a study conducted in Hail City, Kingdom of Saudi Arabia (Alghris et al, 2019) on 292 participants reported revealed that only 46% of the population are aware of cataract. A possible reason for this large difference in findings could be the age range of the surveyed participants and the sample size used in the studies. For example, the study conducted in KSA had a smaller age range 20-56 years old and predominantly younger respondents compared to the Indian and Iran studies. Alghris et al (2019) also reported an associated between increase in age and awareness of common eye diseases.<sup>18</sup> Hence a wider age group of respondents could have also increased overall cataract awareness.

### Night blindness awareness

Nasrin et al (2020) study on 750 participant to determine the general awareness and knowledge of common ocular conditions in Bangladesh showed that 62% of the participants were aware of night blindness. The findings which was found to be higher than 48.3% and 53.4% reported in Nepal

(Shrestha et al,2018; Shrestha et al, 2014)<sup>14,20</sup> Though, the awareness reported in these studies did not vary to a large extent, these studies are quite dissimilar.

### Glaucoma awareness

A study conducted in Osun state Nigeria ( Isawumi et al, 2014) to determine the level of awareness and attitude toward glaucoma among sub-urban and rural communities on 259 participants reported revealed awareness rate of 15.8% for glaucoma.<sup>21</sup> Moreover, a study in Bangladesh recorded a severely reduced glaucoma awareness of 7%.<sup>15</sup> However, a higher awareness of glaucoma was reported in Ethiopia (Alemu et al, 2017) (35.1%), Ghana (De-Gaille and DakoGyeke, 2016) (39%) and Hong Kong (Wong et al, 2020) (86.94%) on 701, 300 and 222 participants respectively. Difference in the results could be due to the method used in selecting participants and sample size used.

### Diabetic retinopathy awareness

A study done by Alghris et al (2019) conducted in Hail City Kingdom of Saudi Arabia reported that awareness of diabetic retinopathy was 40%.<sup>18</sup> Similar findings are reported in the study conducted in Jordon by Haddad, Bakkar and Abdo (2017) to determine the awareness of common eye disease on 802 participants reporting awareness of diabetic retinopathy in the general population was 37%.<sup>25</sup> However, higher awareness of diabetic retinopathy were observed in the studies conducted by Pallerla et al (2020)<sup>17</sup> (65%) Katibeh et al (2014)<sup>7</sup> (86.2%). The lowest reported diabetic retinopathy awareness of 4% was reported in the study conducted in Bangladesh by Islam et al was only 4%.<sup>15</sup> The differences in the level awareness reported for diabetic retinopathy in these studies could have been attributed to the population demographic as well as the number of participants under study.

## Strabismus and Refractive error Awareness

A study conducted in Tabuk City, Saudi Arabia by Lahim et al (2018) to determine awareness and attitudes of common eye diseases that was conducted on 397 participants reported that 64.1% of the participants knew what a refractive error was.<sup>26</sup> Likewise, Pallerla et al (2020) reported in a study conducted in Andhra Pradesh and Telangana, India that awareness of refractive error was 74.3%.<sup>17</sup> The difference in the awareness reported by Lahim et al (2018) and Pallerla et al (2020) could have been due to the demographic characteristic as majority of the participants from the study in India were from rural areas 75% verses those in the urban city of Tabuk.<sup>17,26</sup>

A study conducted in the Hilly region of Nepal by Shrestha et al (2018), reported that the awareness of strabismus was 70.8%.<sup>14</sup> This was the only study reviewed that reported data for strabismus. Thus, there was no baseline for comparison.

### **2.1 Knowledge of common eye diseases**

#### Knowledge of cataract

The study done in Nepal by Shrestha et al (2018) showed that although participant awareness of cataract was the highest of the diseases studied, knowledge on the disease was the most limited at 39.1%.<sup>14</sup> This was seen in similar studies conducted in Bangladesh by Nasrin et al(2019) and Hong Kong by Wong et al(2020) which reported 19%.<sup>19,24</sup> Furthermore, Katibeh et al (2014) reported in the study conducted in Southern India that of those who aware of the disease, 57.3% were able to simply yet accurately define the disease while Pallerla et al (2020) reported that 10.4% of the participants were able to accurately define a cataract as an opacity of the lens.<sup>5,17</sup> Also, Shrestha et al (2018) indicated that almost half, 49.8%, of the aware population knew the onset of the



disease. Likewise in a study conducted by Lahim et al (2018) in Saudi Arabia which reported knowledge of said disease as 64.6% with both studies attaining an average of 64% for knowledge of treatment.<sup>14,26</sup> In contrast, Katibeh reported the highest knowledge for the treatable nature of cataract as 77.2%<sup>7</sup> A major differentiating factor between the studies reviewed was the demographic of the population and how knowledge was defined.

### Night blindness Knowledge

Low night blindness knowledge was reported by Nasrin et al (2019) in the study conducted in Saudi Arabia as 38% for those who were aware.<sup>19</sup> Shrestha et al (2018) reported that the overall knowledge of the those with previous awareness was 72.2% also stating that 52.1% and 41.4% of the participants had awareness of the cause and treatment of the disease respectively.<sup>14</sup> Due to National Vitamin A programme establish in Nepal to increase awareness of the disease and vitamin distribution campaign, knowledge of the disease has increased which is a possible explanation for vast difference in awareness reported by Shrestha et al (2018) and Nasrin et al (2019).<sup>12,19</sup> Nasrin et al also reported that the study did not assess whether not participants knew the correlation between vitamin A and night blindness.<sup>7</sup> This association was assessed however in the study conducted in Nepal.

### Glaucoma knowledge

A study conducted in Haryana North India by Rewri and Kakkar (2014) on 5000 participants to determine the awareness level of glaucoma reported limited knowledge among those who had previously heard or had an awareness of the disease prior which was 1.89%.<sup>27</sup> Conversely, knowledge of glaucoma was higher in studies conducted in Bangladesh by Nasrin et al (2020)

(35%) Northwest Ethiopia by Alemu, Gudeta and Gebreselassie (2017) (49.6%) and Osun State Nigeria by Isawumi et al (2014) (50.9%).<sup>16,19,21,22</sup> Lack of knowledge on causative factor was also reported in the study conducted in Osun State, South-West Nigeria by Isawumi et al (2014) as almost half of the population admitted to not knowing cause of the disease while 24.4% thought it had a supernatural origin.<sup>21</sup> Additionally, only few respondents in the study conducted in Haryana North India, by Rewri and Kakkar (2014) were aware of the hereditary nature of glaucoma 21%, its irreversible vision loss 4.6% and asymptomatic course 0.7%.<sup>27</sup> The study conducted in Gondar Town, Northwest Ethiopia by Alemu, Gudeta and Gebreselassie (2017) reported that mean knowledge score for its participants who had previous awareness of the disease was 8.42 ( $\pm$  2.7 SD) out of 15 showing poor knowledge about the disease.<sup>16</sup> Due to similarities in the native terms used for cataract and glaucoma in India as reported by Rewri and Kakkar (2014), the differences in the knowledge of glaucoma in the studied population compared to other studies could have been due to a misinterpretation between the interviewer and the participant.<sup>27</sup> Interviewer bias may have also been a factor

#### Diabetic retinopathy Knowledge

A study conducted in Tehran, Iran by Katibeh et al reviewed previously reported that 72% of the participants were able define the disease in the simplest of terms.<sup>7</sup> Thapa et al (2015) did a study on 1000 participants in Bhaktapur, Nepal to assess the awareness of the population on retinal diseases mainly Age-Related Macular degeneration and Diabetic Eye Disease reported that 12.2% of the participants were aware of the consequence of diabetes on the eye while 11.5% associated the disease with vision loss.<sup>28</sup> In contrast, Konstantinidis et al (2017) reported in a study conducted in Canton of Vaud Switzerland on 323 participants to determine the prevalence, awareness and practice of eye diseases reported that 96.0% of the participants were aware that diabetes could

damage the eye.<sup>29</sup> A study done in Jordan by Haddad, Bakkar and Abdo (2017).<sup>12</sup> reported 37.4% were knowledgeable on the preventable nature of diabetic retinopathy. However, another study in Tehran Iran by Katibeh et al (2014) to explore knowledge and awareness of eye diseases found that 19% of the participants were aware that diabetic retinopathy had an asymptomatic onset.<sup>5</sup> Despite high knowledge being reported for the potentially damaging effect of diabetes on the eye Konstantinidis et al (2017) this study differed significantly from the other studies mentioned as the study was done on non-institutionalized adults with a confirmed diabetes diagnosis for at least a year while the other studies were done on the general population with or without self-reported diabetes or any systemic disease.<sup>29</sup>

### Refractive error and strabismus knowledge

Although refractive error awareness was studied in two of the studies reviewed, knowledge was subsequently assessed in one of the studies. Lahim et al (2018) reported in a study conducted in Tabuk City, Saudi Arabia knowledge on all of the types of refractive error by only 2.6 % of the participants with previous awareness.<sup>26</sup>

## **2.2 Factors that influence knowledge of common eye diseases**

### **2.21 Influence of age on awareness and knowledge of common eye diseases**

Disparity in awareness of common eyes throughout the different populations investigated can possibly be explained based on population demographic such as age. One major distinguishing factor between the studies is the survey population which can encompass the young adults and the middle aged as seen in the study in Bangladesh by Nasrin et al (2020), middle aged and the elderly

seen in the study in Iran by Katibeh et al (2014), or all adults as in the case of Jordan by Haddad, Bakkar and Abdo (2017).<sup>7,12,19</sup>

### Negative influence of Age

Islam et al (2015) conducted a study in Bangladesh on participants age 30–89 years with mean age of  $51 \pm 12$  SD reported an increase in age was significantly associated with lower awareness as 84% of those 65 and above were aware compared to 94% in those 35 years and below.<sup>15</sup> Similar findings were reported by Shrestha et al (2018) in a study conducted in Nepal on participants 18 and above reported cataract awareness was similar in the 31-40 and the 51-60 year age groups averaging 81.1% and 81.0 respectively but subsequently declined by 20% for those 60 and above.<sup>14</sup> Likewise, Alemu, Gudeta and Gebreselassie (2017) conducted a study in Gondar Town, Ethiopia by on participants aged 35 and above with a mean age of  $48 \pm 20$  SD reported that glaucoma awareness was inversely associated with age as those 65 and older were 69% less aware than the youngest age groups.<sup>22</sup>

### Positive Influence of Age reported

A study done in Jordan by Haddad Bakkar and Abdo (2017) on participants 18 and above with average age of  $28 \pm 11.6$  SD reported increased level of awareness with increase in age for three of the diseases studied though not statistically significant.<sup>12</sup> A cross sectional was conducted by Alghris et al (2019) in Hail City, Kingdom of Saudi Arabia , on 292 respondents age 15-65 years to determine awareness of common eye diseases reported that knowledge and awareness increased with age as the 41-56 age range had the highest-level of awareness and knowledge compared to younger years.<sup>18</sup> Also, a study was conducted in Korea by Lee et al (2017) on 7403 participants

to the determine awareness of Cataract, Age related Macular Degeneration and associated factors of the population reported that awareness of common eye diseases was comparably higher in the 70-79 age group (32.51%) compared to the 50 -59 age group(8.12) <sup>30</sup>

### No Influence of Age

Not all studies reported a relationship observed between age and awareness/knowledge. A study was conducted in Lagos, Nigeria by Mbadugha and Onakaya (2014) on 102 participants ranging in age from 40-79 years to explore the awareness, perception and experience of primary angle glaucoma patient attending a glaucoma clinic reported age among other demographic characteristics was not associated with awareness of the disease studied.<sup>31</sup>

Differences reported in the studies reviewed for association of age on knowledge and awareness of common eye diseases could have been attributed to differences in the demographic population the as well as diseases studied. Alghris et al (2019) reported in the study conducted in Hail City Saudi Arabia that increase in age ultimately can lead to more knowledge and awareness of some disease due to the increased likelihood that the individual already presented with the disease themselves or was more educated.<sup>18</sup> which was observed in the studies conducted in korea by Lee et al (2017) and Lagos,Nigeria by Mbadugha and Onakaya (2014) on participants who already had the disease and presented to clinics.<sup>30,31</sup>

## **2.2 Influence of gender on awareness and knowledge of common eye diseases**

### Male gender associated with higher awareness and knowledge

Like age, gender reportedly can influence the awareness and/or knowledge of common of diseases within a population. A study conducted in Nepal by Shrestha et al (2014) on 1741 outpatients to determine the health literacy of eye diseases with male to female respondent ration of 1.2 reported

notable difference in awareness between genders.<sup>20</sup> They reported that females were significantly associated with lower awareness level particularly for three of the diseases studied mainly cataract, glaucoma and night blindness.<sup>20</sup> A subsequent study was conducted in the Bhaktapur district of Nepal by Thapa et al (2014) on 1000 participants to determine awareness of retinal diseases. <sup>28</sup> Thapa et al (2014) reported that males which accounted for 45.1% of the total population were more likely to have a higher awareness than their female counterparts for diabetic retinopathy. <sup>28</sup> Furthermore, Isawumi et al (2014) conducted a study in Osun State Nigeria on 259 participants to investigate the awareness and attitude of rural adult population towards glaucoma. They reported glaucoma awareness was significantly higher in males.<sup>21</sup>

#### Female gender associated with higher awareness and knowledge

Conversely Katibeh et al (2014) reported in a study conducted in Tehran Iran on 1084 participants reported that knowledge on cataracts was 1.48 times higher in females than male.<sup>7</sup> Higher awareness in the females was also reported by Lee et al (2017) in a study carried out in Korea among 7403 the Korean elderly for awareness common eye diseases, prevalence of common eye diseases as well as associate factors reported that females<sup>30</sup> were 24.33% more aware than males.<sup>30</sup>

#### No association of gender with higher awareness and knowledge

Although many studies reviewed so an association of gender and level of awareness and knowledge, others do not. Mbadugha and Onakoya (2014) reported, in a study carried out in Lagos Nigeria, there was no association between gender and awareness of eye diseases.<sup>31</sup> Similar findings were reported in study conducted in the North India by Rewri and Kakkar (2014).<sup>27</sup>

Due to differences in the expectations of each gender in the different societies, higher awareness and knowledge of common eye diseases will be more associated with a particular gender. In some

of the studies reviewed females are less likely to be educated and if they are it may be limited leading to lower awareness and knowledge of eye diseases. However, other demographic characteristics may have influenced the awareness and knowledge of each gender.

### **2.23 Influence of location and education on awareness and knowledge of common eye diseases**

Geographical location can influence literacy in most instances which can directly impact awareness and knowledge of common eye diseases and knowledge due to inaccessibility to healthcare or devices and materials to obtain more information. Evidence of this was seen in the study conducted in Nepal by Shrestha et al (2014) study which was conducted across urban, semi urban and rural areas.<sup>20</sup> There was a notable association of some eye diseases in particular areas in comparison to others that is, glaucoma and diabetic retinopathy was strongly associated with location unlike cataract, night blindness to name a few.<sup>20</sup> Additionally, this study also highlighted the disparity in literacy across both genders ultimately influences the level of awareness as only 24% of females were literate as opposed to males who accounted for 52%.<sup>20</sup> As mentioned previously, the females in this study were generally less aware of common eye diseases which may be attributed to the lower literacy rates within this gender. Pallerla et al(2020) reported in a study conducted in Southern India reported individuals who had a level of schooling tended to be 4 times more aware and 7 times more knowledgeable than those without formal training.<sup>17</sup> Likewise, studies conducted in Tehran Iran by Katibeh et al (2014)and North western Ethiopia by Alemu, Gudeta and Gebreselassie (2017) both reported that knowledge and awareness on common eye disease increased proportionately with each level of education attained.<sup>7,16,22</sup> Isawumi et al(2014) reported in a study conducted in Osun State Nigeria that those who were highly skilled

professionals especially teachers were likely to have higher awareness and knowledge.<sup>21</sup> The association between low education level and awareness and knowledge on common eye disease is apparent in a finding reported by Islam et al(2015) in a study conducted in Bangladesh. They reported 50% of those who were illiterate did not know that vision loss was preventable.<sup>15</sup>

It is evident that level of education is a significant indicator of awareness and knowledge of as majority of the studies reviewed reported increased awareness and knowledge in participants with some degree of educational training regardless if it was statistically significant or not.

### **2.3 Knowledge and awareness of risk factors for common eye diseases**

Some may argue that having at least one of risk factor or having at least one common eye diseases or interactions with someone directly affected by it significantly increases an individual's level of awareness and knowledge about that disease whether directly or indirectly. A study conducted in Canton of Vaud Switzerland by Konstantinidis et al (2017) on 323 diabetic patients given selfadministered questionnaires, provided results that supported the claim expressed earlier.<sup>29</sup> They reported patients who had Diabetic Retinopathy as a consequence of their type 1 or 2 diabetes, all reported that they had awareness of the effects of diabetes on the eye.<sup>29</sup> However awareness of other common eye diseases in the study was reduced.<sup>29</sup> Likewise, a study conducted in North India by Rewri and Kakkar(2014) reported an association between having known a glaucoma patient and awareness and knowledge of the participant.<sup>27</sup> A study conducted in Korea by Lee et al(2017) on 7403 patients with a diagnosis of cataract or age related macular degeneration patients showed an association between having one of the common of diseases and a heightened awareness of other eye diseases.<sup>30</sup> They reported patients with a previous refractive error or family history of eye disease were more inclined to recognise their condition which was cataract.<sup>30</sup> Also, patients with



systemic diseases according to this study had a greater awareness compared to those without lifestyle diseases.<sup>30</sup>

Conversely in the study conducted in Lagos Nigeria by Mbadugha and Onakoya (2014) on participants with a documented history of glaucoma who were also being managed for the disease reported 37.5% of those survey did not know the hereditary nature of the disease.<sup>31</sup> Furthermore, a study was conducted in Beijing, China by Zhang et al (2017) on 385 residents to determine the awareness of age-related macular degeneration and its risk factors.<sup>32</sup> Zhang et al (2017) reported that knowledge about the main risk factor for ARMD was severely reduced as only 35% of those with reported awareness ,either due to self reporting or association with someone with disease , was able to identify the main modifiable risk factor which was smoking.<sup>32</sup> Similarly, study conducted in North west Ethiopia by Alemu, Gudeta and Gebreselassis (2017) reported that though many of its participants who had a history of systemic diseases like hypertension or diabetes , self reporting of glaucoma or family history of glaucoma only 8.9%,6.1%,4.6% and 3.7% were adequately information on glaucoma.<sup>16</sup>

Differences in the awareness and knowledge of risk factors of common eye diseases assessed in the studies reviewed could have been attributed to overall study design. Lee et al reported that a possible limited of the study was participation bias as persons with interest in the disease or had previous knowledge of disease were more likely to participate.<sup>30</sup> Additionally, since the study was conduct using landline a large population demographic was excluded. Given that the study conducted in Vaud Switzerland by Konstantinidis et al (2017) utilized self-administered questionnaires interviewer bias was completely eliminated which was not the case for the other studies reviewed.

#### **2.4 Awareness and knowledge on the management of common eye diseases.**

Knowledge on the management and treatment of common eye diseases, based on the findings in previous research, suggest that in most instances it is limited regardless of population, region and other demographics. A study conducted in North India by Rewri and Kakkar (2014) rural reported that 14% of the respondents were of the impression that glaucomatous eyes could be treated whereas 39% believed that there is no surgical intervention available.<sup>27</sup> Similar results were reported in Osun State Southwest, Nigeria study by Isawumi et al (2014).<sup>21</sup> They reported that 49% of its respondents had no knowledge that glaucoma could be treated and 36% had knowledge of medical interventions that were available.<sup>21</sup> In general, knowledge on the management of glaucoma was less than 50 percent in most of the studies reviewed except for the results presented in a population survey conducted Jordon by Haddad, Bakkar and Abdo (2020) which reported that 52.2% of its respondents had knowledge of the management of glaucoma.<sup>12</sup> In the same study, it was also reported that 45.0% and 37.4% of its respondents had knowledge that cataract and diabetic retinopathy could be treated respectively.<sup>12</sup> Significantly higher results for cataract management knowledge were obtained in a study conducted in Hilly Nepal by Shrestha et al (2018) which reported 64% of its respondents had knowledge of treatable nature of disease and 82.8% knew where to sort treatment.<sup>14</sup> However, Katibeh et al (2014) reported in a study done in Tehran Iran the highest reported knowledge of the management of cataract and diabetic retinopathy which was reported at 77.2% and 41.6% respectively.<sup>7</sup>

Like the awareness percentages, knowledge on the management of cataract was higher than those figures reported for other common eye diseases. Another area of particular interest is the frequency of eye check ups especially when there is a history of eye disease. Zhao et al (2019) conducted a study in Punjab Pakistan on 2073 participants to determine the awareness, attitude and practices related eye ocular problems and eye care in the general public.<sup>33</sup> They reported only 24.5% of its

respondents with a history eye problem reported a frequency of eye check ups of at least once a year.<sup>33</sup> Thus, for the other 75.5% the likelihood of the eye problem returning or progressing with no observables symptoms greatly increases.

Due to a poorly distributed demographic population as reported by Zhoa et al (2019) the frequency of eye checks reported among the survey participants was mainly a representation of male students and educated females.

## **2.5 Conclusion drawn from review of literature**

In conclusion, the awareness and knowledge of the general public though limited can be influenced by population demographic such as age, gender, education level, geographical location and a pre-existing history of eye diseases or close interaction with someone who does. It is quite apparent based on the studies analysed, that majority of the awareness and knowledge research on common eye diseases globally is in the eastern part of the world. Some research on the western part of the world have been done in the United States of America and even in South America however none within the past two decades could have been found to analyse for this research. The mere fact that this information is not readily available says that more research needs to be done hence the reason for this research being done.

## **CHAPTER THREE**

## **3.0 METHODOLOGY**

### **3.1 Ethical Consideration**

- Ethical approval was obtained from University's Campus Research Ethics Committee.
- Information document was sent to all participants
- Consent was obtained from all participants
- No personal information was collected in order to maintain the utmost respect for participants' confidentiality.
- Data collected was stored on a password secured computer and will be destroyed after 5 years while hard copies of the information will be shredded and burnt.

### **3.2 Overall Study Design**

This was a cross-sectional population-based survey of Trinidad and Tobago population.

### **3.3 Study Population**

The study population were individuals eighteen years and above residing in Trinidad

#### **3.31 Study location**

The study was done in Trinidad. Trinidad and Tobago is a twin island consisting of two main islands of the south-eastern West Indies. It has population of approximately 1.3 million persons with a literacy rate of 98.7 in individuals 15 years and older<sup>29</sup>. Trinidad, by far the larger of the two main islands, has an area of about 1,850 square miles with Tobago the smaller of the two located 20 miles to the northeast of Trinidad with an area of 115 square miles.<sup>30</sup> Trinidad is divided into nine regions, three boroughs, two cities, and one ward.<sup>31</sup>

### 3.32 Study Period

The study was expected to last at least 2-3 months.

### 3.4 Inclusion Criteria

- Residents of Trinidad who are 18 years and above were included

### 3.5 Exclusion Criteria

- Residents of Trinidad who are eye care professionals including ophthalmologist, optometrists, opticians and ophthalmic nurses were excluded
- Individuals or those who could not fully comprehend the questionnaires were excluded

### 3.6 Sample Size

The minimum sample size determined for this survey using Raosoft was 377 participants which was determined based on the population size of Trinidad and Tobago. <sup>29</sup>According to Raosoft for population greater than or equal to 20,000 to have a confidence level of 95%, the minimum expected sample should have been 377.<sup>29</sup>The formula of Rao software was given by the equation below where n was the sample and E was the margin of error;

$$x = Z(c/100)^2 r(100-r)$$

$$n = N x / ((N-1)E^2 + x)$$

$$E = \text{Sqrt}[(N - n)x/n(N-1)]$$

### **3.7 Sampling Procedure**

In order to round up the number and compensate for those who did not want to participate in the study, the sample size was increased to 384. Therefore, 64 individuals were expected to fill the questionnaire from each town selected. Six major selected Curepe, Port of Spain, San Juan, Arima, Tunapuna, Arouca and individuals were chosen at random. These towns were known to be very populated areas with heavy foot traffic. They therefore would have been ideal areas for the researchers of the study to ascertain information while delivering the approximate number of questionnaires to possible participants.

### **3.8 Data collection procedure**

Six major towns in Trinidad were selected and visited to identify the locations of the bus routes. Prior to recruiting participants for the survey, the field investigators sort a suitable location ideally with shelter and slightly private where the questionnaire could have been administered. Individuals were conveniently selected and reasons for the study were explained to them. Those who give their consent to participate were included in the study. Structured questionnaires were administered by the study team to the participants who gave their consent.

### **3.9 Data Analysis**

Data collected were imputed into spread sheet and exported to Statistical Package for Social Science (SPSS) version 24 for analysis. Chi square was used to check for correlation and 0.05 was considered as the critical value.

## **CHAPTER FOUR**

### **4.0 Introduction**

This chapter presents the results of the surveyed population and presented them in tables according to the study objectives.

### **4.1 Demographical profile of the participants**

Two hundred and thirty people participated in this study, 84 (36.5%) were males and 146 (63.5%) were females. Their age ranged from 18-83 years old with a mean age of??. Majority (69.1%) of the participants were aged 18-30, had a Tertiary level educational background (63%) and a good number (28.7%) were in accounting profession (Table 4.1).

**TABLE 1: SHOWING DATA COLLECTED BASED ON VARIOUS DEMOGRAPHICS**

| <b>Demographic</b>            |                  | <b>Frequency</b> | <b>Percent (%)</b> |
|-------------------------------|------------------|------------------|--------------------|
| <b>Sex</b>                    | Male             | 84               | 36.5               |
|                               | Female           | 146              | 63.5               |
|                               |                  |                  |                    |
| <b>Age</b>                    | 18-30            | 159              | 69.1               |
|                               | 31-43            | 44               | 19.1               |
|                               | 44-56            | 12               | 5.2                |
|                               | 57-69            | 11               | 4.8                |
|                               | 70-82            | 3                | 1.3                |
|                               | 83+              | 1                | 0.4                |
|                               |                  |                  |                    |
| <b>Educational background</b> | Primary          | 10               | 4.3                |
|                               | Secondary        | 57               | 24.8               |
|                               | Higher education | 18               | 7.8                |
|                               | Tertiary         | 145              | 63                 |
|                               |                  |                  |                    |
| <b>Occupation</b>             | Agriculture      | 1                | 4                  |
|                               | Labourer         | 21               | 9.1                |
|                               | Business         | 66               | 28.7               |
|                               | Student          | 58               | 25.2               |
|                               | Service          | 56               | 24.3               |
|                               |                  |                  |                    |



|  |       |    |      |
|--|-------|----|------|
|  | Other | 26 | 11.3 |
|--|-------|----|------|

**4.2 Objective 1:** To determine the awareness and knowledge of some ocular conditions among Trinidad and Tobago population

**4.2.1 Awareness**

Cataract has the highest awareness rate (98.3%) followed by glaucoma (80%) and night blindness (50%) (Table 4.2)

**Table 4.2.1:** Awareness of the common eye diseases

| <u>TABLE SHOWING THE GENERAL AWARENESS OF COMMON EYE DISEASES USING FREQUENCIES</u> |       |                  |             |                      |            |          |                 |          |
|---|-------|------------------|-------------|----------------------|------------|----------|-----------------|----------|
|   |       | Refractive error | Keratoconus | Diabetic retinopathy | Strabismus | Glaucoma | Night Blindness | Cataract |
| Valid   | no    | 181              | 204         | 154                  | 175        | 46       | 115             | 3        |
|   | yes   | 49               | 25          | 76                   | 55         | 184      | 115             | 226      |
|   | Total | 230              | 229         | 230                  | 230        | 230      | 230             | 230      |

**4.2.2 Knowledge**

From a total of 230 participants 40% correctly identified knowing it was damage to the nerve at the back of the eye with 14% stating that they were unaware. Majority of responses (12.2%) stated that strabismus is a non-parallel alignment of the eye with 8.7% stating it was a deviation of the eyes. Keratoconus was correctly identified as a thinned cornea that buldges into a cone shape by 4.8% of individuals while 11.7% stated that a refractive error was a result of abnormal bending of light. Majority of persons stated that a cataract was a white opacity over the cornea

(83%) with 56% of the subjects stating it was an opacity of the lens. Finally, night blindness was identified as a vitamin A deficiency by 24.8% of respondents with 8.7% of respondents stating it was difficulty seeing in low lighting or at night. (Table 4.2.2.1)

**Table 4.2.2.1 Knowledge of common eye disease**

| Disease          | Definition  | Frequency | Percentage |
|------------------|---|-----------|------------|
| Glaucoma         | high pressure in the eye                            | 34        | 14.8       |
|                  | damage to the nerve of the eye due to high pressure | 92        | 40.0       |
|                  | age related decrease in vision                      | 9         | 3.9        |
|                  | Don't know  | 33        | 14.        |
|                  | Deviation of eyes                                   | 20        | 8.7        |
| Strabismus       | looking side ways                                   | 3         | 1.3        |
|                  | squeezing the eye in bright light                   | 1         | .4         |
|                  | non parallel alignment of the eye                   | 28        | 12.2       |
|                  | don't know  | 2         | .9         |
| Keratoconus      | steep cornea  | 4         | 1.7        |
|                  | the eyeball is like a cone                          | 1         | .4         |
|                  | thinned cornea that bulges into a cone shape        | 11        | 4.8        |
|                  | dont know   | 4         | 1.7        |
| Refractive Error | myopia  | 7         | 3.0        |
|                  | abnormal bending of light                           | 27        | 11.7       |
|                  | dont know   | 3         | 1.3        |

|                 |  |    |      |
|-----------------|--|----|------|
|                 | other                                    | 7  | 3.0  |
| Cataract        | white opacity over the cornea            | 83 | 83   |
|                 | white spot seen through the pupil        | 28 | 28   |
|                 | white spot in the eye                    | 30 | 30   |
|                 | opacity of the lens                      | 56 | 56   |
|                 | dont know                                | 14 | 14   |
| Night Blindness | difficulty seeing in low lighting /night | 20 | 8.7  |
|                 | Vitamin A deficiency                     | 57 | 24.8 |
|                 | malnutrition                             | 17 | 7.8  |
|                 | dont know                                | 11 | 4.8  |
|                 | other                                    | 1  | 0.4  |

### **4.3 Objective 2: To determine the demographical distribution of the knowledge and awareness of the conditions**

A total of 230 person took part in the study of which 146 participants (63.5%) were females and eighty-four (36.5%) were males.

#### **4.3.1 Ocular condition awareness in relation to demographic profile of the participants**

There was a significant association between occupation and awareness of diabetic retinopathy ( $X^2(2) \geq 14.891, p=0.01$ ) night blindness, keratoconus ( $X^2(2) \geq 12.013, p=0.035$ ). ( $X^2(2) \geq 25.155, p=0.000$ ), strabismus ( $X^2(2) \geq 17.759, p=0.003$ ) and refractive error ( $X^2(2) \geq 26.511,$

$p=0.000$ ) as all  $p$ -values were less than 0.05. However, no significant association was found between occupation and awareness of cataract ( $X^2(2) \geq 15.394, p=0.118$ ) (Table 4.3.1.1).

No significant association was also not seen between gender and awareness of cataract ( $X^2(2) \geq 5.835, p=0.0054$ ), glaucoma ( $X^2(2) \geq 3.169, p=0.075$ ), diabetic retinopathy ( $X^2(2) \geq 0.644, p=0.422$ ) keratoconus ( $X^2(2) \geq 0.265, p=0.607$ ) and refractive error ( $X^2(2) \geq 1.698, p=0.193$ ). As all  $p$ -values were greater than 0.05. However, there was an association between gender and awareness of strabismus ( $X^2(2) \geq 4.926, p=0.026$ ) and night blindness ( $X^2(2) \geq 10.802, p=0.001$ ). (Table 4.3.1.2).

Age showed no direct association to the awareness of common eye diseases as  $p$  values calculated were all greater than the chosen significant value of 0.05. Knowledge of diabetic retinopathy as it relates to age did however show an association with age of participants ( $X^2(2) \geq 16.948, p=0.005$ ). (Table 4.3.1.3)

There was no association between knowledge of glaucoma ( $X^2(2) \geq 1.004, p=0.8$ ), strabismus ( $X^2(2) \geq 2.610, p=0.456$ ), diabetic retinopathy ( $X^2(2) \geq 1.167, p=0.761$ ), night blindness ( $X^2(2) \geq 4.819, p=0.186$ ), cataract ( $X^2(2) \geq 6.041, p=0.419$ ) keratoconus ( $X^2(2) \geq 5.433, p=0.143$ ) and level of education as all  $p$ -values were greater than 0.05. However, an association was found between the level of education and knowledge of refractive errors ( $X^2(2) \geq 10.30, p=0.016$ ) (Table 4.3.1.4).

**Table 4.3.1.1: Association of occupation with awareness of ocular conditions**

|         |            |    |     | Pearson Chi square |                         |
|---------|------------|----|-----|--------------------|-------------------------|
| Disease | Occupation | No | Yes | Value              | Asymptotic significance |
|         |            |    |     |                    |                         |

|                        |             |    |    |                     |       |
|------------------------|-------------|----|----|---------------------|-------|
| <b>Night blindness</b> | Agriculture | 0  | 1  | 25.155 <sup>a</sup> | 0.000 |
|                        | Service     | 30 | 26 |                     |       |
|                        | Business    | 38 | 28 |                     |       |

|  |          |    |    |  |  |
|--|----------|----|----|--|--|
|  | Labourer | 28 | 3  |  |  |
|  | Student  | 26 | 42 |  |  |
|  | Other    | 23 | 13 |  |  |

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|                 |             |   |    |                     |       |
|-----------------|-------------|---|----|---------------------|-------|
| <b>Cataract</b> | Agriculture | 0 | 1  | 15.394 <sup>a</sup> | 0.118 |
|                 | Service     | 0 | 56 |                     |       |
|                 | Business    | 0 | 56 |                     |       |
|                 | Labourer    | 1 | 20 |                     |       |
|                 | Student     | 0 | 57 |                     |       |
|                 | Other       | 2 | 24 |                     |       |

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|-----------------|-------------|----|----|--------------------|-------|
| <b>Glaucoma</b> | Agriculture | 0  | 1  | 7.777 <sup>a</sup> | 0.169 |
|                 | Service     | 9  | 47 |                    |       |
|                 | Business    | 12 | 54 |                    |       |
|                 | Labourer    | 9  | 12 |                    |       |
|                 | Student     | 11 | 47 |                    |       |
|                 | Other       | 5  | 21 |                    |       |

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|                             |             |    |    |                     |       |
|-----------------------------|-------------|----|----|---------------------|-------|
| <b>Strabismus</b>           | Agriculture | 1  | 0  | 17.759 <sup>a</sup> | 0.003 |
|                             | Service     | 48 | 8  |                     |       |
|                             | Business    | 56 | 10 |                     |       |
|                             | Labourer    | 10 | 11 |                     |       |
|                             | Student     | 41 | 17 |                     |       |
|                             | Other       | 17 | 9  |                     |       |
|                             |             |    |    |                     |       |
| <b>Diabetic retinopathy</b> | Agriculture | 0  | 1  | 14.891 <sup>a</sup> | 0.011 |
|                             | Service     | 44 | 12 |                     |       |
|                             | Business    | 47 | 19 |                     |       |
|                             | Labourer    | 17 | 4  |                     |       |
|                             | Student     | 32 | 26 |                     |       |
|                             | Other       | 13 | 13 |                     |       |
|                             |             |    |    |                     |       |
| <b>Keratoconus</b>          | Agriculture | 1  | 0  | 12.013 <sup>a</sup> | 0.035 |
|                             | Service     | 52 | 4  |                     |       |
|                             | Business    | 63 | 3  |                     |       |
|                             | Labourer    | 20 | 1  |                     |       |
|                             | Student     | 46 | 12 |                     |       |
|                             | Other       | 21 | 5  |                     |       |
|                             |             |    |    |                     |       |
| <b>Refractive error</b>     | Agriculture | 1  | 0  | 26.511 <sup>a</sup> | 0.000 |
|                             | Service     | 50 | 6  |                     |       |
|                             | Business    | 52 | 14 |                     |       |
|                             | Labourer    | 21 | 0  |                     |       |
|                             | Student     | 33 | 25 |                     |       |
|                             | Other       | 22 | 4  |                     |       |

**Table 4.3.1.2: Association of gender with awareness of common eye conditions**

|                             |        |     |     | Pearson Chi square  |                         |
|-----------------------------|--------|-----|-----|---------------------|-------------------------|
| Disease                     | Sex    | No  | Yes | Value               | Asymptotic significance |
| <b>Night blindness</b>      | Male   | 54  | 30  | 10.802 <sup>a</sup> | 0.001                   |
|                             | Female | 61  | 85  |                     |                         |
|                             |        |     |     |                     |                         |
| <b>Cataract</b>             | Male   | 3   | 81  | 5.835 <sup>a</sup>  | 0.054                   |
|                             | Female | 0   | 145 |                     |                         |
|                             |        |     |     |                     |                         |
| <b>Glaucoma</b>             | Male   | 22  | 62  | 3.169 <sup>a</sup>  | 0.075                   |
|                             | Female | 24  | 122 |                     |                         |
|                             |        |     |     |                     |                         |
| <b>Strabismus</b>           | Male   | 57  | 27  | 4.926 <sup>a</sup>  | 0.026                   |
|                             | Female | 118 | 28  |                     |                         |
|                             |        |     |     |                     |                         |
| <b>Diabetic retinopathy</b> | Male   | 59  | 25  | 0.644 <sup>a</sup>  | 0.422                   |
|                             | Female | 95  | 51  |                     |                         |
|                             |        |     |     |                     |                         |

|                         |        |     |    |                    |       |
|-------------------------|--------|-----|----|--------------------|-------|
| <b>keratoconus</b>      | Male   | 76  | 8  | 0.265 <sup>a</sup> | 0.607 |
|                         | Female | 128 | 17 |                    |       |
|                         |        |     |    |                    |       |
| <b>Refractive error</b> | Male   | 70  | 14 | 1.698 <sup>a</sup> | 0.193 |
|                         | Female | 111 | 35 |                    |       |

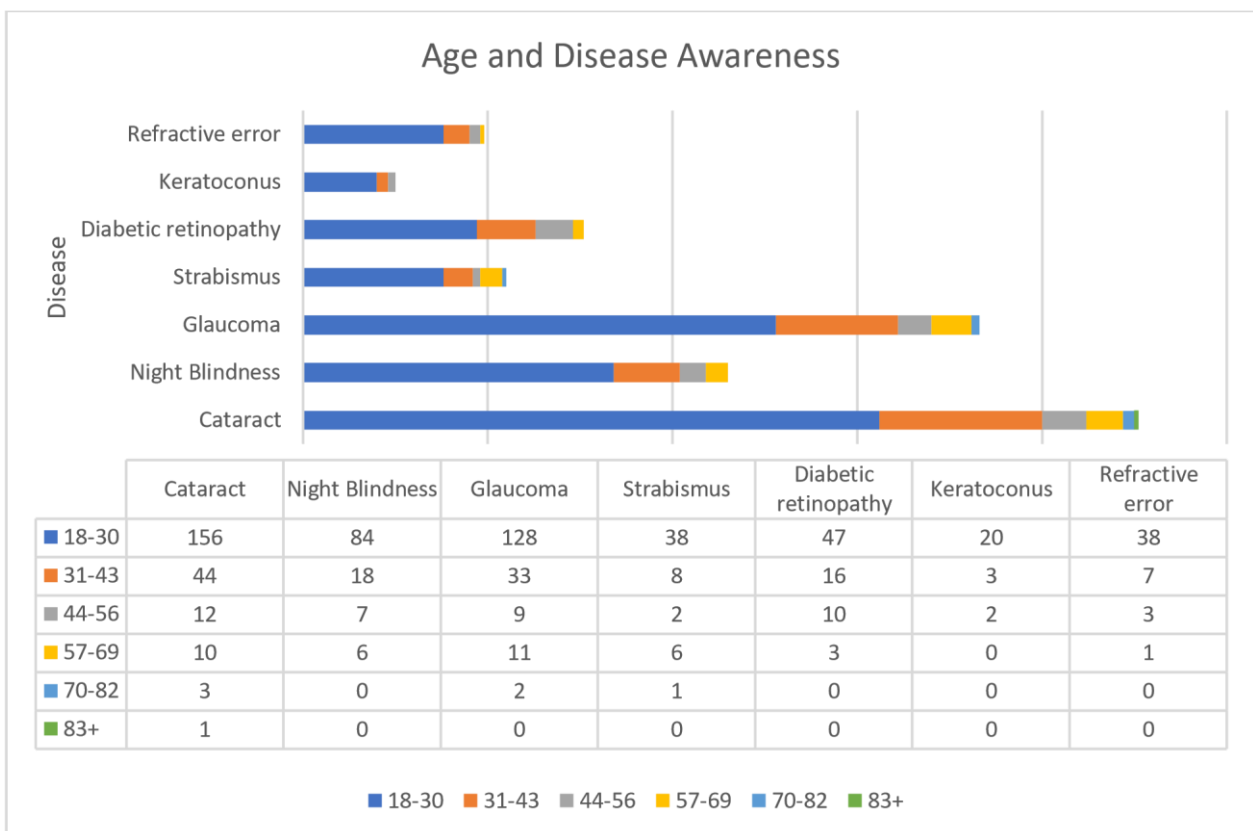
**Table 4.3.1.3: Association of age of participants with awareness of common eye conditions**

|                        |       |    |     | Pearson Chi square |                         |
|------------------------|-------|----|-----|--------------------|-------------------------|
| Disease                | Age   | No | Yes | Value              | Asymptotic significance |
| <b>Night blindness</b> | 18-30 | 75 | 84  | 6.388 <sup>a</sup> | 0.270                   |
|                        | 31-43 | 26 | 18  |                    |                         |
|                        | 44-56 | 5  | 7   |                    |                         |
|                        | 57-69 | 5  | 6   |                    |                         |
|                        | 70-82 | 3  | 0   |                    |                         |
|                        | 83+   | 1  | 0   |                    |                         |
|                        |       |    |     |                    |                         |
| <b>Cataract</b>        | 18-30 | 2  | 156 | 6.424 <sup>a</sup> | 0.778                   |
|                        | 31-43 | 0  | 44  |                    |                         |
|                        | 44-56 | 0  | 12  |                    |                         |
|                        | 57-69 | 1  | 10  |                    |                         |
|                        | 70-82 | 0  | 3   |                    |                         |
|                        | 83+   | 0  | 1   |                    |                         |



|                             |       |     |     |                     |       |
|-----------------------------|-------|-----|-----|---------------------|-------|
|                             |       |     |     |                     |       |
| <b>Glaucoma</b>             | 18-30 | 31  | 128 | 4.233 <sup>a</sup>  | 0.516 |
|                             | 31-43 | 11  | 33  |                     |       |
|                             | 44-56 | 3   | 9   |                     |       |
|                             | 57-69 | 0   | 11  |                     |       |
|                             | 70-82 | 1   | 2   |                     |       |
|                             | 83+   | 0   | 1   |                     |       |
|                             |       |     |     |                     |       |
| <b>Strabismus</b>           | 18-30 | 121 | 38  | 7.274 <sup>a</sup>  | 0.201 |
|                             | 31-43 | 36  | 8   |                     |       |
|                             | 44-56 | 10  | 2   |                     |       |
|                             | 57-69 | 5   | 6   |                     |       |
|                             | 70-82 | 2   | 1   |                     |       |
|                             | 83+   | 1   | 0   |                     |       |
|                             |       |     |     |                     |       |
| <b>Diabetic retinopathy</b> | 18-30 | 112 | 47  | 16.948 <sup>a</sup> | 0.005 |
|                             | 31-43 | 28  | 16  |                     |       |
|                             | 44-56 | 2   | 10  |                     |       |
|                             | 57-69 | 8   | 3   |                     |       |
|                             | 70-82 | 3   | 0   |                     |       |
|                             | 83+   | 1   | 0   |                     |       |
|                             |       |     |     |                     |       |

|                         |       |     |    |                    |       |
|-------------------------|-------|-----|----|--------------------|-------|
| <b>keratoconus</b>      | 18-30 | 139 | 20 | 3.335 <sup>a</sup> | 0.648 |
|                         | 31-43 | 41  | 3  |                    |       |
|                         | 44-56 | 10  | 2  |                    |       |
|                         | 57-69 | 10  | 0  |                    |       |
|                         | 70-82 | 3   | 0  |                    |       |
|                         | 83+   | 1   | 0  |                    |       |
|                         |       |     |    |                    |       |
| <b>Refractive error</b> | 18-30 | 121 | 38 | 3.562 <sup>a</sup> | 0.614 |
|                         | 31-43 | 37  | 7  |                    |       |
|                         | 44-56 | 9   | 3  |                    |       |
|                         | 57-69 | 10  | 1  |                    |       |
|                         | 70-82 | 3   | 0  |                    |       |
|                         | 83+   | 1   | 0  |                    |       |



**Table 4.3.1.4: Correlation between educational level and awareness of common eye diseases**

|                        |                   |    |     | Pearson Chi square |                         |
|------------------------|-------------------|----|-----|--------------------|-------------------------|
| Disease                | Educational level | No | Yes | Value              | Asymptotic significance |
| <b>Night blindness</b> | Primary           | 8  | 2   | 4.819 <sup>a</sup> | 0.186                   |
|                        | Secondary         | 30 | 27  |                    |                         |
|                        | Higher Edu.       | 7  | 11  |                    |                         |
|                        | Tertiary.         | 70 | 75  |                    |                         |
|                        |                   |    |     |                    |                         |

|                 |             |    |     |                    |       |
|-----------------|-------------|----|-----|--------------------|-------|
| <b>Cataract</b> | Primary     | 0  | 10  | 6.041 <sup>a</sup> | 0.419 |
|                 | Secondary   | 2  | 54  |                    |       |
|                 | Higher Edu. | 0  | 18  |                    |       |
|                 | Tertiary    | 1  | 144 |                    |       |
|                 |             |    |     |                    |       |
| <b>Glaucoma</b> | Primary     | 1  | 9   | 1.004 <sup>a</sup> | 0.800 |
|                 | Secondary   | 13 | 44  |                    |       |
|                 | Higher Edu. | 4  | 14  |                    |       |
|                 | Tertiary    | 28 | 117 |                    |       |
|                 |             |    |     |                    |       |

|                             |             |     |    |                     |       |
|-----------------------------|-------------|-----|----|---------------------|-------|
| <b>Strabismus</b>           | Primary     | 6   | 4  | 2.610 <sup>a</sup>  | 0.456 |
|                             | Secondary   | 44  | 13 |                     |       |
|                             | Higher Edu. | 12  | 6  |                     |       |
|                             | Tertiary    | 113 | 32 |                     |       |
|                             |             |     |    |                     |       |
| <b>Diabetic retinopathy</b> | Primary     | 8   | 2  | 1.167 <sup>a</sup>  | 0.761 |
|                             | Secondary   | 36  | 21 |                     |       |
|                             | Higher Edu. | 12  | 6  |                     |       |
|                             | Tertiary    | 98  | 47 |                     |       |
|                             |             |     |    |                     |       |
| <b>keratoconus</b>          | Primary     | 10  | 0  | 5.433 <sup>a</sup>  | 0.143 |
|                             | Secondary   | 53  | 3  |                     |       |
|                             | Higher Edu. | 17  | 1  |                     |       |
|                             | Tertiary    | 124 | 21 |                     |       |
|                             |             |     |    |                     |       |
|                             |             |     |    |                     |       |
| <b>Refractive error</b>     | Primary     | 10  | 0  | 10.300 <sup>a</sup> | 0.016 |
|                             | Secondary   | 51  | 6  |                     |       |
|                             | Higher Edu. | 15  | 3  |                     |       |
|                             | Tertiary    | 105 | 40 |                     |       |

### 4.3.2 Ocular condition knowledge in relation to demographic profile of the participant

No association was found between gender and common eye diseases glaucoma ( $X^2(2) \geq 6.745$ ,  $p=0.150$ ), strabismus ( $X^2(2) \geq 8.230$ ,  $p=0.144$ ), diabetic retinopathy ( $X^2(2) \geq 5.048$ ,  $p=0.410$ ), keratoconus ( $X^2(2) \geq 1.277$ ,  $p=0.735$ ) and refractive error ( $X^2(2) \geq 0.993$ ,  $p=0.803$ ) but gender did show a significant association with the diseases, cataract ( $X^2(2) \geq 13.890$ ,  $p=0.016$ ) and night blindness ( $X^2(2) \geq 15.434$ ,  $p=0.009$ ). Similar to gender, no significant association was observed between knowledge and age of participants for the diseases, night blindness ( $X^2(2) \geq 36.881$ ,  $p=0.059$ ) strabismus ( $X^2(2) \geq 31.380$ ,  $p=0.177$ ), diabetic retinopathy ( $X^2(2) \geq 36.380$ ,  $p=0.066$ ), keratoconus ( $X^2(2) \geq 11.818$ ,  $p=0.066$ ) and refractive error ( $X^2(2) \geq 0.11567$ ,  $p=0.239$ ). This was not the case for the diseases cataract and glaucoma which showed a small association to the age of participants. Based on the results education showed a significant association with the diseases, cataract ( $X^2(2) \geq 21.813$ ,  $p=0.040$ ) strabismus ( $X^2(2) \geq 33.73$ ,  $p=0.004$ ), refractive error ( $X^2(2) \geq 15.187$ ,  $p=0.019$ ) and night blindness ( $X^2(2) \geq 40.298$ ,  $p=0.001$ ). The opposite is true for the diseases glaucoma ( $X^2(2) \geq 13.340$ ,  $p=0.24$ ), diabetic retinopathy ( $X^2(2) \geq 14.438$ ,  $p=0.493$ ), keratoconus ( $X^2(2) \geq 5.977$ ,  $p=0.426$ ). Lastly occupation showed no direct association with the knowledge of cataract ( $X^2(2) \geq 29.618$ ,  $p=0.076$ ), glaucoma ( $X^2(2) \geq 20.752$ ,  $p=0.412$ ), keratoconus ( $X^2(2) \geq 21.000$ ,  $p=0.050$ ) and refractive errors ( $X^2(2) \geq 6.233$ ,  $p=0.716$ ) but however showed a small association with the diseases night blindness ( $X^2(2) \geq 51.79$ ,  $p=0.001$ ), strabismus ( $X^2(2) \geq 54.992$ ,  $p=0.001$ ) and diabetic retinopathy ( $X^2(2) \geq 45.652$ ,  $p=0.007$ ). (Table 4.3.2.1)

While no association was found between how participants defined the diseases night blindness ( $X^2(2) \geq 15.434$ ,  $p=0.009$ ), Glaucoma ( $X^2(2) \geq 6.745$ ,  $p=0.150$ ), strabismus ( $X^2(2) \geq$

8.230  $p=.144$ ), Diabetic retinopathy ( $X^2(2) \geq 5.048$   $p=.410$ ), Keratoconus ( $X^2(2) \geq 1.277$   $p=.735$ ), refractive error ( $X^2(2) \geq .993$   $p=.803$ ) and gender, there was an association for cataract ( $X^2(2) \geq 13.890$   $p=.016$ ). Age was also associated with how participants defined the diseases cataract ( $X^2(2) \geq 37.634$   $p=.0100$ ) and glaucoma ( $X^2(2) \geq 36.456$   $p=.014$ ). Level of education was statistically associated with how participants defined the diseases cataract ( $X^2(2) \geq 21.813$   $p=.040$ ), night blindness ( $X^2(2) \geq 40.298$   $p < .001$ ), Strabismus ( $X^2(2) \geq 33.73$   $p=.004$ ) and Refractive error ( $X^2(2) \geq 15.187$   $p=0.019$ ). Additionally, occupation also influenced how participants defined night blindness ( $X^2(2) \geq 51.79$   $p=.001$ ), strabismus ( $X^2(2) \geq 54.992$   $p < .001$ ) and Diabetic retinopathy ( $X^2(2) \geq 45.652$   $p=0.007$ ). Based on the results it was evident that educational level had the greatest influence on how participants defined the diseases regardless of how accurate it the response was. Of the diseases studied, participant knowledge on cataract, mainly how they defined the disease, was the most influenced by demographic characteristic. (Table 4.3.2.1)

**Table 4.3.2.1 Association between knowledge as it relates to subject demographics**

|                 | Pearson Chi Square | Demographics |         |           |            |
|-----------------|--------------------|--------------|---------|-----------|------------|
|                 |                    | Gender       | Age     | Education | Occupation |
| Cataract        | Value              | 13.890a      | 37.634a | 21.813a   | 29.618a    |
|                 | Asymptotic 2 sided | .016         | .010    | .040      | .076       |
| Night Blindness | Value              | 15.434a      | 36.881a | 40.298a   | 51.79a     |
|                 | Asymptotic 2 sided | .009         | .059    | <.001     | .001       |
| Glaucoma        | Value              | 6.745a       | 36.456a | 13.340a   | 20.752a    |

|                      |                    |        |         |         |         |
|----------------------|--------------------|--------|---------|---------|---------|
|                      | Asymptotic 2 sided | .150   | .014    | .24     | .412    |
| Strabismus           | Value              | 8.230a | 31.380a | 33.734a | 54.992  |
|                      | Asymptotic 2 sided | .144   | .177    | 0.004   | <.001   |
| Diabetic retinopathy | Value              | 5.048a | 36.380a | 14.438a | 45.652a |
|                      | Asymptotic 2 sided | .410   | .066    | .493    | .007    |
| Keratoconus          | Value              | 1.277a | 11.818a | 5.977a  | 21.000a |
|                      | Asymptotic 2 sided | .735   | .066    | .426    | .050    |
| Refractive error     | Value              | .993a  | 11.567a | 15.187a | 6.233a  |
|                      | Asymptotic 2 sided | .803   | .239    | .019    | .716    |

#### **4.4 Objective 3: To assess the knowledge and awareness of the risk factors of the eye diseases**

From a total of 230 participants 41.3% reported lacked knowledge on the risk factors of the disease cataract, while only 34.8% identified aging a risk factor for the disease followed by congenital. In terms of glaucoma only 39.1% were aware of its hereditary nature. Similarly, only 16.5% of participants that reported awareness of the disease strabismus reported that person could simply be born with it. Another risk highlighted for strabismus by the participants was trauma 4.3%. While, many of the participants identified diabetes as a risk for diabetic retinopathy only 13% associated uncontrolled diabetes with diabetic retinopathy. Similarly on 5.2 % of participants

identified the duration of diabetes as a risk factor. Majority of the participants correctly identified family history and age as risk factors o the disease keratoconus

7.4% and 4.2% respectively.(Table 4.4.1)

|                      | <b>Cause or Risk factor</b> | <b>Frequency</b> | <b>percent</b> |
|----------------------|-----------------------------|------------------|----------------|
| Cataract             | aging                       | 80               | 34.8           |
|                      | trauma                      | 35               | 15.2           |
|                      | congenital                  | 38               | 16.5           |
|                      | malnutrition                | 22               | 9.6            |
|                      | don't know                  | 95               | 41.3           |
| Glaucoma             | No family predisposition    | 28               | 12.2           |
|                      | Family predisposition       | 90               | 39.1           |
|                      | dont know                   | 45               | 19.6           |
| Strabismus           | hereditary                  | 38               | 16.5           |
|                      | eye disease                 | 4                | 1.7            |
|                      | trauma                      | 11               | 4.3            |
|                      | don't know                  | 10               | 0.9            |
|                      | other                       | 2                | 4.8            |
| Diabetic retinopathy | having diabetes             | 22               | 9.6            |
|                      | uncontrolled diabetes       | 30               | 13             |
|                      | prolonged diabetes          | 12               | 5.2            |
|                      | smoking                     | 5                | 2.2            |
|                      | hypertension                | 12               | 5.2            |



|             |                      |    |     |
|-------------|----------------------|----|-----|
|             | other                | 1  | 0.4 |
| Keratoconus | family history       | 17 | 7.4 |
|             | age                  | 10 | 4.3 |
|             | chronic inflammation | 8  | 3.5 |
|             | systemic disease     | 6  | 2.6 |
|             | Don't know           | 3  | 1.3 |
|             | other                | 2  | .9  |

**4.6: Objective 5: To evaluate the knowledge and awareness of the management of the eye diseases**

From the 230 participants 76.5% identified surgery as the main treatment for cataract. (Table 4.6.1) In terms of awareness of the management of night blindness, only 43,3% reported that a source of Vitamin A was fruits and vegetables while 29.4% reported supplements as a source. (Table 4.6.2) Conversely only 5.6% of the respondents reported that they lacked knowledge on sources of Vitamin A. (Table 4.6.3) Forty four percent of respondents reported that a possible treatment of diabetic retinopathy was to control the blood sugar levels which was followed by surgery 28.9%. (Table 4.6.4) Roughly 2.6% reported that there was no treatment available for diabetic retinopathy. (Table 4.6.4) Unlike diabetic retinopathy, the amount of participants that reported awareness for treatment of strabismus and the those that lacked knowledge of treatment were roughly the same 5.7% and 5.2% respectively. (Table 4.6.5) The highest reported treatment for keratoconus was contact lenses at 37.8% followed by surgery with 33.3%. (Table 4.6.5)

**Table 4.6.1:** Knowledge on cataract treatment

| <b>Cataract</b> |           |              |
|-----------------|-----------|--------------|
| Treatment       | Frequency | Percentage % |
| medicine        | 15        | 6.5          |
| surgery         | 176       | 76.5         |
| dont know       | 14        | 6.1          |
| other           | 2         | .9           |

**Table 4.6.2:** Knowledge on the source of Vitamin A for management of night blindness

| <b>Night Blindness</b> |   |           |         |
|------------------------|---|-----------|---------|
|                        |   | Responses |         |
|                        |   | Frequency | Percent |
| Sources of Vitamin A   | eat green leafy vegetables, yellow fruits, meat | 78        | 43.3%   |
|                        | eat meat and fish                               | 38        | 21.1%   |
|                        | supplements                                     | 53        | 29.4%   |
|                        | Dont know                                       | 10        | 5.6%    |
|                        | others  | 1         | 0.6%    |

**Table 4.6.3:** Knowledge on the of treatment for Diabetic Retinopathy

| <b>Diabetic Retinopathy</b>                         |                            |           |              |
|---|----------------------------|-----------|--------------|
| Possible treatment options for diabetic retinopathy | Treatment Response         | Frequency | Percentage % |
|   | no treatment available     | 2         | 2.6%         |
|   | control blood sugar levels | 34        | 44.7%        |
|   | laser surgery              | 22        | 28.9%        |

|  |           |    |       |
|--|-----------|----|-------|
|  | bush tea  | 3  | 3.9%  |
|  | dont know | 15 | 19.7% |

**Table 4.6.4:** Knowledge on the of treatment for strabismus

| <b>Strabismus</b>                           |           |           |            |
|---|-----------|-----------|------------|
|   | Response  | Frequency | Percentage |
| Availability of treatment for<br>Strabismus | no        | 5         | 2.2        |
|   | yes       | 13        | 5.7        |
|   | dont know | 12        | 5.2        |
|   |           |           |            |

**Table 4.6.5:** Knowledge on the of treatment for Keratoconus

| <b>Keratoconus</b>           |              |           |             |
|------------------------------|--------------|-----------|-------------|
|                              |              | Frequency | Percentage% |
| Treatment for<br>Keratoconus | contact lens | 17        | 37.8%       |
|                              | glasses      | 9         | 20.0%       |
|                              | surgery      | 15        | 33.3%       |
|                              | dont know    | 2         | 4.4%        |
|                              | other        | 2         | 4.4%        |

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## **CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATION**

### **5.0 Introduction**

This chapter discusses results presented in chapter 4 as it relates to participants knowledge on common eye diseases, knowledge based on gender, age, education and education. Knowledge of risk factors and management of the common eye diseases presented.

### **5.1 Discussion**

## 5.12 Awareness and knowledge of common eye diseases based on gender

A total of 230 person took part in the study of which 146 participants (63.5%) were females and eighty-four (36.5%) were males. Based on the results of the Pearson Chi square we found that the diseases, cataract ( $X^2(2) \geq 5.835$ ,  $p=0.0054$ ), glaucoma ( $X^2(2) \geq 3.169$ ,  $p=0.075$ ), diabetic retinopathy ( $X^2(2) \geq 0.644$ ,  $p=0.422$ ) keratoconus ( $X^2(2) \geq 0.265$ ,  $p=0.607$ ) and refractive error ( $X^2(2) \geq 1.698$ ,  $p=0.193$ ) showed no association between the awareness of those named diseases and the gender of persons. However, it should be noted that while the majority of the diseases showed no association between the gender of individuals and their knowledge there was a small association between gender and the diseases, strabismus ( $X^2(2) \geq 4.926$ ,  $p=0.026$ ) and night blindness ( $X^2(2) \geq 10.802$ ,  $p=0.001$ ).

Similar findings were reported in studies in Nigeria (Mbadugha and Onakoya, 2014) and India (Rewri and Kakkar, 2014). On the contrary studies conducted in Nepal (Shrestha et al, 2014) on 1741 outpatients with male to female respondent ration of 1:2 reported that females were significantly associated with lower awareness level particularly for three of the diseases studied mainly cataract, glaucoma and night blindness than males. Katibeh et al (2014) study in Tehran Iran on 1084 subjects concluded that awareness of cataracts was 1.48 times higher in females than males. Reasons for the differences obtained in these studies may be linked to the number of participants involved as well as the ratio of male to female subjects.

### Knowledge

Results concluded that there was also no association between gender and knowledge of common eye diseases like glaucoma ( $X^2(2) \geq 6.745$ ,  $p=0.150$ ), strabismus ( $X^2(2) \geq 8.230$ ,  $p=0.144$ ), diabetic retinopathy ( $X^2(2) \geq 5.048$ ,  $p=0.410$ ), keratoconus ( $X^2(2) \geq 1.277$ ,  $p=0.735$ ) and

refractive error ( $X^2(2) \geq 0.993$ ,  $p=0.803$ ) showing a significant association with the diseases, cataract ( $X^2(2) \geq 13.890$ ,  $p=0.016$ ) and night blindness ( $X^2(2) \geq 15.434$ ,  $p=0.009$ ).

Our study, similar to that of Mbadugha and Onakoya (2014) had a smaller sample size compared to the research studies of Shrestha et al (2014) and Katibeh et al (2014) where association between gender and awareness were found. This study also had a survey sample with a male to female ratio of 1:2 similar to the study done by Nepal by Shrestha et al (2014) yet producing contrary results. We can however conclude that not enough evidence was obtained to suggest an association between gender and awareness and knowledge of common eye diseases.

### **5.1.2 Knowledge and awareness of common eye diseases based on age**

To conclude based on the results obtained no direct association to the knowledge of common eye diseases and age was observed with the exception of awareness of diabetic retinopathy as it relates to age which did show an association with age of participants ( $X^2(2) \geq 16.948$ ,  $p=0.005$ ). As it relates to knowledge, the results showed no significant association between knowledge and age of participants for the diseases, night blindness ( $X^2(2) \geq 36.881$ ,  $p=0.059$ ) strabismus ( $X^2(2) \geq 31.380$ ,  $p=0.177$ ), diabetic retinopathy ( $X^2(2) \geq 36.380$   $p=0.066$ ), keratoconus ( $X^2(2) \geq 11.818$ ,  $p=0.066$ ) and refractive error ( $X^2(2) \geq 011.567$ ,  $p=0.239$ ). This was not the case for the diseases cataract and glaucoma which showed a small association to the age of participants. A similar study conducted in Lagos, Nigeria by Mbadugha and Onakaya (2014) on 102 participants ranging in age from 40-79 years also reported age showing no association with awareness of the disease studied.<sup>31</sup>

On the contrary, Islam et al (2015) conducted a study in Bangladesh reported an increase in age was significantly associated with lower awareness as 84% of those 65 and above were more aware compared to 94% in those 35 years and below.<sup>15</sup> Similarly, a study done by Shrestha et al (2018) conducted in Nepal on participants 18 and above reported cataract awareness was similar in the 31-40 and 51-60 age groups averaging 81.1% and 81.0 respectively with awareness declining by approximately 20% for those 60 and above.<sup>14</sup>

Like the study done by Mbadugha and Onakaya (2014) this study had a similar sample size only shy of approximately 100 respondents. The small survey size could be a possible reason for similar conclusion being made. However, the survey sample differed in terms of age range, Mbadugha and Onakaya (2014) having a survey sample of ages between 40-79 years old while this study included persons 18 years and older. The studies done by Islam et al (2015) and Shrestha et al (2018) that would have concluded and found relationships between age and knowledge of participants, both had larger sample sizes of 3104 and 1834 respectively.<sup>14,15</sup>

Although evidence of the influence of age on awareness is seen in three studies discussed as seen in chapter 2.21 we can conclude that like gender in this study there isn't a substantial amount of evidence to link the knowledge of respondents to their age.

## **5.2 Factors that may affect knowledge and awareness of common eye diseases**

From this study we did see a significant association between occupation and awareness of common eye diseases including; diabetic retinopathy ( $X^2(2) \geq 14.891$ ,  $p=0.01$ ) night blindness, keratoconus ( $X^2(2) \geq 12.013$ ,  $p=0.035$ ). ( $X^2(2) \geq 25.155$ ,  $p=0.000$ ), strabismus ( $X^2(2) \geq 17.759$ ,  $p=0.003$ ) and refractive error ( $X^2(2) \geq 26.511$ ,  $p=0.000$ ) and excluding awareness of cataract ( $X^2(2) \geq 15.394$ ,  $p=0.118$ ).

Occupation showed no direct association with the knowledge of cataract, glaucoma, keratoconus and refractive errors ( $p$  value  $>0.05$ ) but however showed a small association with the diseases night blindness ( $X^2(2) \geq 51.79, p=0.001$ ), strabismus ( $X^2(2) \geq 54.992, p=0.001$ ) and diabetic retinopathy ( $X^2(2) \geq 45.652, p=0.007$ )

However, as it pertains to awareness and association to educational level there was no significant association between awareness of glaucoma ( $X^2(2) \geq 1.004, p=0.8$ ), strabismus ( $X^2(2) \geq 2.610, p=0.456$ ), diabetic retinopathy ( $X^2(2) \geq 1.167, p=0.761$ ), night blindness ( $X^2(2) \geq 4.819, p=0.186$ ), cataract ( $X^2(2) \geq 6.041, p=0.419$ ) keratoconus ( $X^2(2) \geq 5.433, p=0.143$ ) and level of education but there was a small association between the level of education and knowledge of refractive errors ( $X^2(2) \geq 10.30, p=0.016$ ). Knowledge as it relates to education showed a significant association with the diseases, cataract strabismus, refractive error and night blindness ( $p$  value  $<0.05$ ). The opposite is true for the diseases; glaucoma, diabetic retinopathy, keratoconus ( $p$  values  $> 0.05$ ).

A similar study done in Ethiopia concluded that a higher level of education, income and a family history of diseases contributed to persons being aware of some of the diseases.<sup>10</sup> In comparison while our study did not examine characteristics such as income and family history there was no association between awareness or knowledge of common eye diseases and educational background. On the contrary we did determine a significant association between the occupation of respondents to their awareness of some diseases. Notable differences between the studies can only be attributed to the sample size as age range was the same, being 18 years and older.

Alghris et al (2019) reported in a study that an increase in age can lead to more knowledge and awareness of some disease due to the increased likelihood that the individual already presented



with the disease themselves.<sup>18</sup> Our results however while in the graph presented (Bar graph) appears to show that the 18-30 age group are more aware of the common eye diseases studied cannot be a fair representation based on age as 69.1%, accounting for over half of the respondents were within that age group.

### **5.3 Awareness of risk factors associated with common eye diseases**

Based on the results in this study it is evident that awareness of risk factors of common eye diseases varies dependently on the disease. While cataract awareness was the highest among the study participants 98.3% knowledge on its risk factors was quite low. The most reported risk factor for cataract was aging 34.8% while 41.3% lacked knowledge on any risk factors of the disease. In terms of glaucoma, roughly two fifths of the study population were aware that having a family member with the disease increase the likelihood of developing the disease. This was higher than the findings reported in Lagos Nigeria by Mbadugha and Onakoya (2014) and North India, by Rewri and Kakkar (2014). Knowledge of the participants on the risk factors of diabetic retinopathy, strabismus, keratoconus and refractive error was severely reduced. Interestingly, many of the participants defined night blindness in relation to its risk factor as 24.8% of participants defined the disease as a vitamin A deficiency which is still relatively low

### **5.3 Awareness of management or treatment of common eye diseases**

Knowledge on management of the studied diseases were reduced in most instances except cataract. Majority of the participants were able to identify surgery as the treatment option for cataract 76.5%. Similarly, knowledge on the management of diabetic retinopathy was relatively high to comparison to other diseases studied as most participants were able to identify controlling diabetes as the main treatment option 44.7% with reporting surgery as a treatment

option for diabetic retinopathy. Knowledge on the treatment of strabismus was reported in 5.7% of the participants while. Conversely, knowledge on the treatment options for keratoconus was contact lens 37.8% and surgery 33.3%. Given that the response rate of the participants decreased severely with some of the diseases, the data collected for management may not be completely reliable or it be indicate that participants were not aware of possible treatment options.

#### **5.4 General knowledge and awareness**

Based on results obtained in the study it is apparent that awareness and knowledge of common eye disease is severely reduced for most diseases. The level of knowledge of some ocular conditions has been shown to be reduced in most studies reviewed. The highest reported for diseases studied was cataract which had an awareness rate (98.3%) followed by glaucoma (80%) and night blindness (50%). The lowest reported awareness was keratoconus 10%. In terms of knowledge cataract had the highest proportion of participants correctly identify the disease as an opacity of the lens 56%. The percentages of participant correcting identifying night blindness, glaucoma, strabismus, diabetic retinopathy, keratoconus and refractive error were 24.8%, 12.2%, 40%, 4.8%, and 11.7% respectively. As previously mention awareness rate of common eye diseases does not always reflect in the knowledge of the disease. This especially apparent in this study as well as studies conducted in in Nepal by Shrestha et al(2018) and Hong Kong by Wong et al(2020).<sup>14,25</sup>

#### **5.5 Conclusion**

The research studied the awareness and knowledge of common eye diseases among the population of Trinidad. It was determined that awareness of some eyes is higher but is not the

reflected in what is known about the disease. Factors determined to influenced knowledge and awareness of the general population on common eye diseases were age, gender, education and occupation

## **5.6 Limitations**

- A relatively small sample size was obtained which can't be generalized based on the size of the population
- Poor responses/ participation was observed during the study as a lot of people were reluctant to participate
- Results obtained cannot be compared nationally as no study was done previously in Trinidad and Tobago.
- Restriction of movement due to the COVID-19 pandemic affected data collection since it was done in face to face.
- Knowledge on management of glaucoma could not be assessed as it was omitted from the survey in error.

## **5.7 Recommendations**

- Future studies with a larger study sample should be conducted
- In order to properly assess knowledge and eliminate the likelihood of false positives, it is recommended that further studies utilize the Likert scale.
- Since this study did not assess attitudes of the population towards the diseases studied, it will be beneficial to explore that area in detail.

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## **Appendix**

### **Research Project**

**Facilitated by;** Akera Pope, Moesha Tyson

The purpose of this study is to determine how aware and knowledgeable the general population of Trinidad and Tobago are about common eye diseases in comparison to other countries. Personal information gathered in this questionnaire will NOT be released to any individual not directly affiliated with this survey nor any members of the public. This questionnaire is a modified version of verified questionnaire administered in the “**Awareness of eye health and diseases among the population of the hilly region of Nepal**” (1) study.

This questionnaire will be filled out by either of the field investigators, Akera Pope or Moesha Tyson, who will choose the answer from the list below that is closest to the participant’s response to the questions being asked.

| <b>Demographics</b> |   |
|---------------------|---|
| <b>Sex</b>          | <input type="checkbox"/> Female <input type="checkbox"/> Male   |
| <b>Age</b>          | <input type="checkbox"/> 18 -30 <input type="checkbox"/> 31-43 <input type="checkbox"/> 44-56 <input type="checkbox"/> 57-69 <input type="checkbox"/> 70-82 <input type="checkbox"/> 83+  |
| <b>Ethnicity</b>    | <input type="checkbox"/> African <input type="checkbox"/> East Indian <input type="checkbox"/> Mixed<br><input type="checkbox"/> Other (please specify): _____  |
| <b>Religion</b>     | <input type="checkbox"/> Christian <input type="checkbox"/> Hindu <input type="checkbox"/> Muslim <input type="checkbox"/> Other: _____   |
| <b>Education</b>    | <input type="checkbox"/> Illiterate <input type="checkbox"/> Literate no formal training<br><input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Higher education <input type="checkbox"/> Tertiary and above |
| <b>Occupation</b>   | <input type="checkbox"/> Agriculture <input type="checkbox"/> Service <input type="checkbox"/> Business <input type="checkbox"/> Labourer<br><input type="checkbox"/> Student <input type="checkbox"/> Other (please specify): _____                  |

| <b>Awareness of general eye problems</b> |  |
|--|--|
| What are eye problems?                   | <input type="checkbox"/> Vision blurring <input type="checkbox"/> Red eye <input type="checkbox"/> Pain/sore eye<br><input type="checkbox"/> Burning/itching/foreign body sensation/grittiness<br><input type="checkbox"/> Watering <input type="checkbox"/> eye/discharge<br><input type="checkbox"/> Others; _____ |
| What are the causes of eye problems?     | <input type="checkbox"/> Infection/germs <input type="checkbox"/> Environmental pollution <input type="checkbox"/> Genetic/congenital<br><input type="checkbox"/>  |

|   |   |
|---|---|
|   | Evil/god/supernatural <input type="checkbox"/> Aging/nutrition <input type="checkbox"/><br><input type="checkbox"/> Others _____<br><br><input type="checkbox"/> Don't know   |
| What should you do to prevent eye problems? | <input type="checkbox"/> Visit in health centers <input type="checkbox"/> Eye hygiene <input type="checkbox"/> Visit traditional healers<br><input type="checkbox"/> Eat green vegetables/fruits <input type="checkbox"/> Eye protection /glasses <input type="checkbox"/> Don't know |

**Please put a tick in the box next to your choice or write in the space provided where needed.**

**Section 1**

**Section 2**

| <b>Knowledge about night blindness</b>  |   |
|---|---|
| What is the cause of night blindness in children?                                 | <input type="checkbox"/> Difficulty to see in low /night <input type="checkbox"/> Vitamin A deficiency<br><input type="checkbox"/> Malnutrition <input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____  |
| How can we prevent night blindness?   | <input type="checkbox"/> Food-green leafy vegetables, yellow fruits, meat and fish<br><input type="checkbox"/> Hospital <input type="checkbox"/> Others <input type="checkbox"/> Don't know   |
| <b>Awareness of common eye diseases</b>   |   |
| What are sources of vitamin A?  | <input type="checkbox"/> Food-green leafy vegetables, yellow fruits<br><input type="checkbox"/> Food-meat and fish <input type="checkbox"/> Vitamin A capsule <input type="checkbox"/> Don't know<br><input type="checkbox"/> Others: _____   |
| Which of the following diseases have you heard of before? (tick all that applies) | <input type="checkbox"/> cataract<br><input type="checkbox"/> night blindness<br><input type="checkbox"/> Glaucoma<br><input type="checkbox"/> Others: _____  |
| How did you know about night blindness?   | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours <input type="checkbox"/> Media-TV/radio/newspapers<br><input type="checkbox"/> Diabetic retinopathy<br><input type="checkbox"/> Others: _____ |
| <b>Knowledge of Cataract</b>  |   |
| What is a cataract?   | <input type="checkbox"/> keratoconus<br><input type="checkbox"/> refractive error<br><input type="checkbox"/> white spot in the eye <input type="checkbox"/> opacity in the lens  |
|   | <input type="checkbox"/> white opacity over the cornea<br><input type="checkbox"/> white spot seen through the pupil<br><input type="checkbox"/> others _____   |
| When does cataract develop/occur?   | <input type="checkbox"/> Since birth <input type="checkbox"/> During childhood <input type="checkbox"/> Old age<br><input type="checkbox"/> Any age <input type="checkbox"/> Don't know<br><input type="checkbox"/> others: _____   |
| What is the cause of cataract?  | <input type="checkbox"/> Age <input type="checkbox"/> Trauma <input type="checkbox"/> Congenital <input type="checkbox"/> Malnutrition<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____  |
| How did you know about cataract?  | <input type="checkbox"/> Doctors/paramedics/medicals<br><input type="checkbox"/> Eye camp/pamphlets/brochures<br><input type="checkbox"/> Friends/relatives/neighbours<br><input type="checkbox"/> Media-TV/radio/newspapers<br><input type="checkbox"/> Others   |
| What is the treatment for cataract?   | <input type="checkbox"/> Medicine <input type="checkbox"/> Surgery <input type="checkbox"/> Don't know<br><input type="checkbox"/> Others _____   |
| Where should you go for treatment?  | <input type="checkbox"/> Hospital/ health facility <input type="checkbox"/> Faith healer/traditional healer<br><input type="checkbox"/> No idea <input type="checkbox"/> Others: _____  |
|   | <input type="checkbox"/> Others _____ <input type="checkbox"/> nothing  |

| <b>Knowledge of Strabismus</b>             |  |
|--|--|
| What is strabismus?                        | <input type="checkbox"/> Deviation of eyes <input type="checkbox"/> Squeezing of eyes in bright light<br><input type="checkbox"/> Looking side way <input type="checkbox"/> Non parallel alignment of eyes   |
| What can cause strabismus?                 | <input type="checkbox"/> Congenital/hereditary <input type="checkbox"/> Trauma to the eye<br><input type="checkbox"/> Blessings/curse/luck <input type="checkbox"/> Disease of the eye<br><input type="checkbox"/> Gazing at intense light <input type="checkbox"/> Others: _____<br><input type="checkbox"/> Don't know |
| Is there any remedy for strabismus?        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know   |
| What could be the problem with strabismus? | <input type="checkbox"/> Cosmetic distortion <input type="checkbox"/> Loss of confidence<br><input type="checkbox"/> Psychological trauma <input type="checkbox"/> Problem with marriage<br><input type="checkbox"/> Decrease vision <input type="checkbox"/> Others: _____  |
| How did you know about strabismus?         | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours <input type="checkbox"/> Media-TV/radio/newspapers   |



|  |  |
|--|--|
|  | <input type="checkbox"/> Others: _____ |
|--|--|

| <b>Knowledge of Glaucoma</b>                        |  |
|---|--|
| What is glaucoma?                                   | <input type="checkbox"/> High pressure inside the eye<br><input type="checkbox"/> Damage to the nerve of the eye due to high pressure<br><input type="checkbox"/> Age related decrease in vision<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____ |
| Does glaucoma have a familial predisposition?       | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know   |
| What are symptoms/signs of glaucoma?                | <input type="checkbox"/> Asymptomatic <input type="checkbox"/> Severe pain <input type="checkbox"/> Halos /rings around light<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____  |
| Is vision loss in glaucoma reversible or permanent? | <input type="checkbox"/> Reversible <input type="checkbox"/> permanent <input type="checkbox"/> don't know   |
| How did you know about glaucoma?                    | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours <input type="checkbox"/> Media-TV/radio/newspapers<br><input type="checkbox"/> Others; _____                 |

| <b>Knowledge of Diabetic Retinopathy</b> |   |
|--|---|
| What is diabetes retinopathy?            | <input type="checkbox"/> Damage to the blood vessels at the back of the eye<br><input type="checkbox"/> Haziness of the lens <input type="checkbox"/> Damage to the eye |

|  |   |
|--|---|
|  | <input type="checkbox"/> Same as cataract <input type="checkbox"/> Same as glaucoma |
|--|---|

| <b>Knowledge Keratoconus</b>                        |  |
|---|--|
| What is keratoconus?                                | <input type="checkbox"/> Steep cornea <input type="checkbox"/> The eyeball is like a cone<br><input type="checkbox"/> Thin cornea that bulges into a cone shape<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others;                                    |
| What are some symptoms associated with keratoconus? | <input type="checkbox"/> Clouding of vision <input type="checkbox"/> Halos around light<br><input type="checkbox"/> Increased sensitivity to bright light <input type="checkbox"/> Headaches<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____ |
| What are risk factors associated with keratoconus?  | <input type="checkbox"/> Age <input type="checkbox"/> Family history <input type="checkbox"/> Systemic disorders<br><input type="checkbox"/> Chronic inflammation of the eye <input type="checkbox"/> Don't know<br><input type="checkbox"/> others : _____                |
| Are there any treatments for keratoconus?           | <input type="checkbox"/> Contact lenses <input type="checkbox"/> Glasses <input type="checkbox"/> Corneal cross linking<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others; _____  |
| How did you know about keratoconus?                 | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochures<br><input type="checkbox"/> Friends/relatives/neighbour <input type="checkbox"/> Media-TV/radio/newspapers<br><input type="checkbox"/> Others: _____             |

|  |  |
|--|--|
|  | <input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____   |
| What are the risk factors for diabetic retinopathy?    | <input type="checkbox"/> having diabetes <input type="checkbox"/> having uncontrolled diabetes<br><input type="checkbox"/> having diabetes for a prolonged period of time<br><input type="checkbox"/> smoking<br><input type="checkbox"/> other systemic conditions like high blood pressure and cholesterol<br><input type="checkbox"/> don't know <input type="checkbox"/> other : _____ |
| What are possible treatments for diabetic retinopathy? | <input type="checkbox"/> no treatments <input type="checkbox"/> control blood sugar levels <input type="checkbox"/> laser surgery<br><input type="checkbox"/> bush tea <input type="checkbox"/> don't know <input type="checkbox"/> others; _____  |
| How did you know about diabetic retinopathy?           | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours <input type="checkbox"/> Media-TV/radio/newspapers<br><input type="checkbox"/> Others: _____   |

|                                       |  |
|---------------------------------------|--|
| <b>Knowledge of refractive errors</b> |  |
| What is a refractive error?           | <input type="checkbox"/> Myopia <input type="checkbox"/> Hyperopia <input type="checkbox"/> Abnormal bending of light<br><input type="checkbox"/> Don't know <input type="checkbox"/> Other: _____   |
| What is myopia?                       | <input type="checkbox"/> The eye is too long<br><input type="checkbox"/> Light converges before the back of the eye<br><input type="checkbox"/> Opposite of hyperopia<br><input type="checkbox"/> Don't know <input type="checkbox"/> Others |

|                    |   |
|--------------------|---|
| What is hyperopia? | <input type="checkbox"/> The eye is too small<br><input type="checkbox"/> Light converges behind the back of the eye<br><input type="checkbox"/> same as myopia <input type="checkbox"/> don't know <input type="checkbox"/> other: _____ |
|--------------------|---|

| <b>General health information</b>   |   |
|---|---|
| Do you have any systemic illness?   | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know  |
| What are they?  | <input type="checkbox"/> Hypertension <input type="checkbox"/> Diabetes <input type="checkbox"/> Arthritis<br><input type="checkbox"/> Asthma <input type="checkbox"/> other: _____   |
| Did you undergo eye check-up for systemic illness?                        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know  |
| Could systemic illness affect the eye?                                    | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know  |
| How did you come to know about effect of systemic illness in the eye      | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours<br><input type="checkbox"/> Sufferings from systemic diseases<br><input type="checkbox"/> Media-TV/radio/newspaper <input type="checkbox"/> Others        |
| Having a high positive prescription increases your risk of what diseases? | <input type="checkbox"/> Strabismus <input type="checkbox"/> Don't know <input type="checkbox"/> Others: _____  |
| Having a high minus prescription increases your risk of what diseases?    | <input type="checkbox"/> Glaucoma <input type="checkbox"/> Cataract <input type="checkbox"/> Retinal detachment   |
| How did you know about refractive errors?                                 | <input type="checkbox"/> Doctors/paramedics/medicals <input type="checkbox"/> Eye camp/pamphlet/brochure<br><input type="checkbox"/> Friends/relatives/neighbours<br><input type="checkbox"/> Sufferings from systemic diseases<br><input type="checkbox"/> Media-TV/radio/newspaper <input type="checkbox"/> Others: _____ |

Raw Data [https://1drv.ms/x/s!AqksbmDU7i9u4WuDZWZ4obCxI\\_ZH](https://1drv.ms/x/s!AqksbmDU7i9u4WuDZWZ4obCxI_ZH)

