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KNOWLEDGE, ATTITUDE AND PRACTICES OF EYE HEALTH CARE AMONG UNIVERSITY OF GHANA GRADUATE STUDENTS.

BY

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DECLARATION

I, PERFECT EMEFA TITIATI, thereby declare that apart from other researchers' work that have been duly acknowledged, this dissertation is my original work with inputs of my supervisor and it has not been presented elsewhere for another degree either in part or in whole.

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DR. FRANCES BAABA da-COSTA VROOM DATE

(SUPERVISOR)

DEDICATION

This work is dedicated to God almighty, who has granted me strength to complete this study successfully. I also dedicate this work to my husband, children, parent, siblings and the Graduate students without whom this work wouldn't have been a success.

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ABSTRACT

Background

Population growth and ageing are increasing the number of people who are having increase demand for eye care (WHO, 2018; Baidoo, 2009). Disease of the eye accounts for visual impairment and blindness. Blinding and non-blinding eye diseases account for ocular morbidity and is a devastating factor of health. The youth form the working force of any country. They require good eye health to remain active and productive in all aspects of lives. Moreover, 80-90% of blinding eye conditions are preventable when detected early, by forming the right attitude of regular check-up. Graduate students, majority are youth and have achieved the highest level of education, they have larger roles they play in the secular work, they have responsibility towards their families and have influence on their families. **Objective**: To assess the knowledge, attitude, and practices of eye health among University of Ghana Graduate Students.

Methods The study was a cross-sectional study using quantitative method. A self-administered questionnaire was used to collect data on demographic characteristics, vision and health history, knowledge level of eye conditions, attitude towards eye health and practices of eye health with guide from selected previous studies. A stratified sampling process was used select 403 graduate students from all the four colleges in the university excluding all eye health personnel such as ophthalmologist, optometrist, ophthalmic nurses and opticians. A proportionate sampling was used to arrive at the numbers from schools under each college. Every 3rd graduate student who consented in each school under the various colleges were enrolled.

Results: The study comprised of 237 males (58.8%) and 166 (41.2%) females with the mean age 30.6±6.4years. Majority of graduate students 224 (55.6%) were ranged 20-29years. Awareness about glaucoma was the highest 88.09%, cataract was 62.03 and

refractive error was 40.45. About 4% have never heard about any of the eye conditions. The overall mean score for knowledge is 7.33±4.26. The mean score for attitude towards eye healthcare was 25.55±2.59. The study found the overall level of knowledge about eye conditions was poor 77.17%, 82.88% had good attitude toward eye health care, their main source of information on eye health care was TV/Radio commercial 39.7%. Out of 403 participants, 334 have ever checked their eyes and 69 of them have never checked their eyes. Good practice was eyes checked in 2years or less was 213 of 403 (52.9%). A multivariate analysis showed a significant association between good knowledge and good attitude on good practice.

Conclusion

The findings of this study revealed the level of knowledge was poor; attitude towards eye health care was good. However, knowledge is significant factor on attitude that influence practice of eye health care. There is the need to intensify eye health education among graduate students, to increase knowledge and practice so to ensure early detection of eye diseases and management.

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LIST OF ABBREVIATIONS

DALYS	Disability Adjusted Life Years
IAPB	International Agency for the Prevention of Blindness
MDG	Millennium Development Goals
OAG	Open Angle Glaucoma
SDG	Sustainable Development Goals
URE	Uncorrected refractive error
WHO	World Health Organization

Key Words

Eye Health, Knowledge, Attitude, Practice, Glaucoma, Cataract, Refractive Error.

CHAPTER ONE

INTRODUCTION

1.1 Background

Population growth and ageing are increasing the number of people who are having increased demand for eye care (Baidoo, 2009; WHO, 2019). Good ocular health is vision measured 6/6 or better with or without correction and the eyes are disease free. Disease of the eye accounts for visual impairment and blindness (Roodhooft, 2002; Teutsch, Mccoy, & Woodbury, 2016). Blinding and non-blinding eye diseases account for ocular morbidity and is a devastating factor of health yet it has received little attention in health promotion globally (Herring, 2004; Isawuni, Hassan, Asekun-Olarinmove, Akinwusi, Adebimpe, Alebiosu, 2013). It is estimated that 54 million people aged 60 years and above will be blind by the year 2020, of these numbers over 50 million is expected to be in developing countries (International Agency for the Prevention, 2010). Often reported eye conditions such as pain, poor vision, and trauma may lead to an adult seeking eye care. One's level of education, occupation, and routine visual function (example use of computer, use of mobile phone, watching TV) determine the variation in visual needs, as well as family history of eye disease among close relatives.

According to the World Health Organization (WHO) the term "visual impairment" comprises of moderate and severe visual impairment as well as blindness. "Blindness" is defined as presenting visual acuity worse than 3/60 or a corresponding visual field loss to less than 10° in the better eye. "Moderate visual impairment" is defined as presenting visual acuity in the range from worse than 6/18 to 6/60. "Severe visual impairment" is defined as presenting visual acuity of worse than 6/60 and equal to or better than 3/60 (World Health Organisation, 2010). WHO asserts that the global magnitude and causes of

visual impairment and blindness call for action to change the lives of millions of people Globally, the estimated number of people who live with some form of visual impairment are approximately 1.3 billion. For the distance vision, 188.5 million of them have mild vision impairment, 217 million have moderate to severe vision impairment, and 36 million people are blind (Bourne et al., 2010; Chestnov, 2012). About 826 million people have near vision impairment (Fricke et al., 2018).

In Africa, access to eye health care among people is 30% including the distribution of eye care services (Murthy & Raman, 2009). The leading causes of the visual impairment globally are uncorrected refractive error (48.99%), cataract (25.81%), glaucoma (2.78%) and age related macular disease (AMD) (4.10%). The prevalence of cataract, glaucoma and refractive error, are similar in Africa and Ghana and their treatment are cheaper and widely available (Al Faran, Al-Rajhi, Al-Omar, Al-Ghamdi, & Jabak, 1993; Bourne et al., 2010; Guzek, Anyomi, Fiadoyor, & Nyonator, 2005; Hogeweg, Schader, Hermans, & Keizer, 1994; Potter, 1991; Stevens et al., 2013).

Ghana has signed to VISION 2020, a global initiative that aims at eliminating avoidable blindness by the year 2020. It was set out to promote a world in which nobody is needlessly visually impaired, and those with unavoidable vision loss can achieve their full potential. Investing in vision would significantly enhance a country's achievement of Sustainable Development Goals (SDG) (Holden & Resnikoff, 2002). The SDG 3 is to ensure healthy lives and promote well-being for all ages that is: specifically universal health for all, strengthening capacity for early warning, risk reduction, and the management of national and global health risks (Faal & Gilbert, 2015). Vision 2020's major priorities are cataract; trachoma; onchocerciasis; childhood blindness, refractive error and low vision. These have been selected not only because of the burden of blindness they represent but, also, the feasibility and affordability of interventions to prevent and

treat these conditions (Holden & Resnikoff, 2002). In support of the Vision 2020 was the Global Eye Health Action plan was set out to reduce avoidable visual impairment as a public health issue, ensure access to rehabilitation service to the visually impaired. This requires Member States of WHO of which Ghana is part are to focus on achieving the set out plans (Faal & Gilbert, 2015).

Hence, effective interventions are required to prevent eye diseases, delay or reverse vision impairment and blindness. The goals are to be achieved by implementing primary and comprehensive eye health interventions at all levels of health care delivery. Improving access to comprehensive eye care services by integrating it into existing health systems.

As a result, integrating eye health into the existing health care system will promote comprehensive health care delivery system and is strategic to achieve visual health. For example eye being part of the routine medical checkup for all especially those with diabetic and hypertensive history, it has been established that about 5% causes of blindness is due to diabetic retinopathies and hypertension (Boutayeb, 2016). Appropriate eye education and community participation in eye health care in Ghana are crucial to preventing blindness and eye impairment (Ilechie, Otchere, Darko-takyi, & Halladay, 2013) among graduate students.

It is indicated that 75-80% causes of blindness are reversible or avoidable when detected early (Kanj & Mitic, 2009; Lakhan & Sharma, 2010; WHO, 2019). American Academy of Ophthalmology (2015) affirms that a comprehensive eye care, which includes periodic eye and vision examinations, is an important part of preventive health care. This because many eye and vision problems have no obvious signs or symptoms, so one might not know a problem exists until they check.

1.2 Problem Statement

Globally, the prevalence of visual impairment has been estimated to be in excess of 223 million people, of which 191 million have low to severe vision impairment (LSMVI) and 32.4 million are blind (Stevens et al., 2013). In Africa, about 26.3% have been estimated to have some form of visual impairment. Out of this 20.4 million have low vision and 5.9 million are blind, and 15.3% of the global population that have visual impairment reside in Africa (WHO, 2019). In Ghana, 0.74% of the population are blind and 1.07% have visual impairment (Wiafe, 2015).

Refractive error is a major cause of visual impairment (Budenz et al., 2012; Shrestha, Guo, Maharjan, Gurung, & Ruit, 2014; Wiafe, 2015). Ntim-Amponsah et al., (2004) indicates that Ghana is ranked second highest in the world with the Open Angle Glaucoma (OAG) at a prevalence rate of 8.5%. Studies have indicated low level of knowledge, attitude and practice in developing and Low to Medium Income Countries (LMIC) (Livingston, Mccarty, & Taylor, 1998; Sapkota, Dulal, Sunu Poudyal, 2012). Visual impairment and blindness reduces the quality of life. It has huge impact on the physical, functional, economic and social well-being of individual, families of those affected and the nation at large (Baidoo, 2009; Kanj & Mitic, 2009). Undeniably visual problems increase in old age but early diagnosis minimizes the risk (Salvi, Aktar, & Currie, 2016). Adequate knowledge and the appropriate attitude acquired in one's lifetime helps them make informed choices, reduce health risks and increase quality of life.

The demand of academic work among graduate students makes them spend longer hours behind the computer. The computer emits non ionizing radiations that has damaging effects on the eyes thereby increasing their risk of having visual impairment (Ng, 2003; Zaret et al, 1976).

Graduate programs across Universities in Ghana, are designed to train individuals and professionals from all backgrounds to develop skills to solve lives problems. This is expected to allow for the realization of the health needs of communities and promote a healthy lifestyle by these professionals among others. Also, graduate programs are supposed to train the most productive elite group.

Graduate students of whom majority are youth are the working force of any country. They require healthy vision among others to remain very productive on the job and every aspect of their lives. Therefore it will be prudent to have better knowledge, attitude, and practice about eye healthcare.

This study therefore assessed the level of knowledge on cataract, glaucoma and refractive error, attitude and practices of eye health care among University of Ghana Graduate students.

1.3 Research Questions

1. What is the knowledge of University of Ghana graduates about eye health, the common eye conditions such as cataract, uncorrected refractive error and glaucoma?
2. What is the attitude of UG graduate students towards Eye health care?
3. What are the practices of eye health care among UG graduate students?
4. How do health history of graduates, knowledge and attitude influence practices of eye health care?

1.3.1 General Objective

To assess the knowledge, attitude, and practices of eye health care among University of Ghana Graduate Students.

1.3.2 Specific Objectives

1. To determine the knowledge of UG graduate students about eye health care based on common eye conditions such as cataract, uncorrected refractive error and glaucoma.
2. To assess the attitude of University of Ghana graduate students towards eye health care.
3. To assess practices of eye health care among UG graduate students.
4. To determine the influence of knowledge and attitude on practice of eye health care among University of Ghana graduate students.

1.4 Justification of the Study

In Africa, access to eye health care among people is 30% and the distribution of eye care services varies within and across countries (Murthy & Raman, 2009). Ghana's population has been growing since 1960s and now the demographic transition is from youthful population to adult population, so cataract and presbyopia which is age related is anticipated to increase and may occur at an earlier age (GDP, 2018; Yorston, 1998).

In Ghana, studies have been carried out on knowledge about glaucoma in communities but little has been done on KAP of cataract, refractive error and glaucoma as a triad among graduate students.

To target programs appropriately for eye health education and community participation, data must be available on the knowledge, attitude and practices of eye health of the population. Adults are widely perceived to play a critical role in the family, community and society (Murray, 1996). Graduates have the skills required to develop strategies needed to improve health, example: personal health check, being able to encourage families to improve one's health and that of the community, can best champion health

education and the subsequent change in health seeking behavior. Assessing the levels of knowledge, attitude and practice will help develop a more effective process to create awareness intervention. This will allow vision related programs to be tailored more appropriately towards the needs of the community if made functional through community outreaches and visual rehabilitation projects.

KAP of eye health among UG graduate students is significant and will bridge the gap on utilization of eye health services and inform development of educational campaign about eye health.

1.5 Conceptual Framework

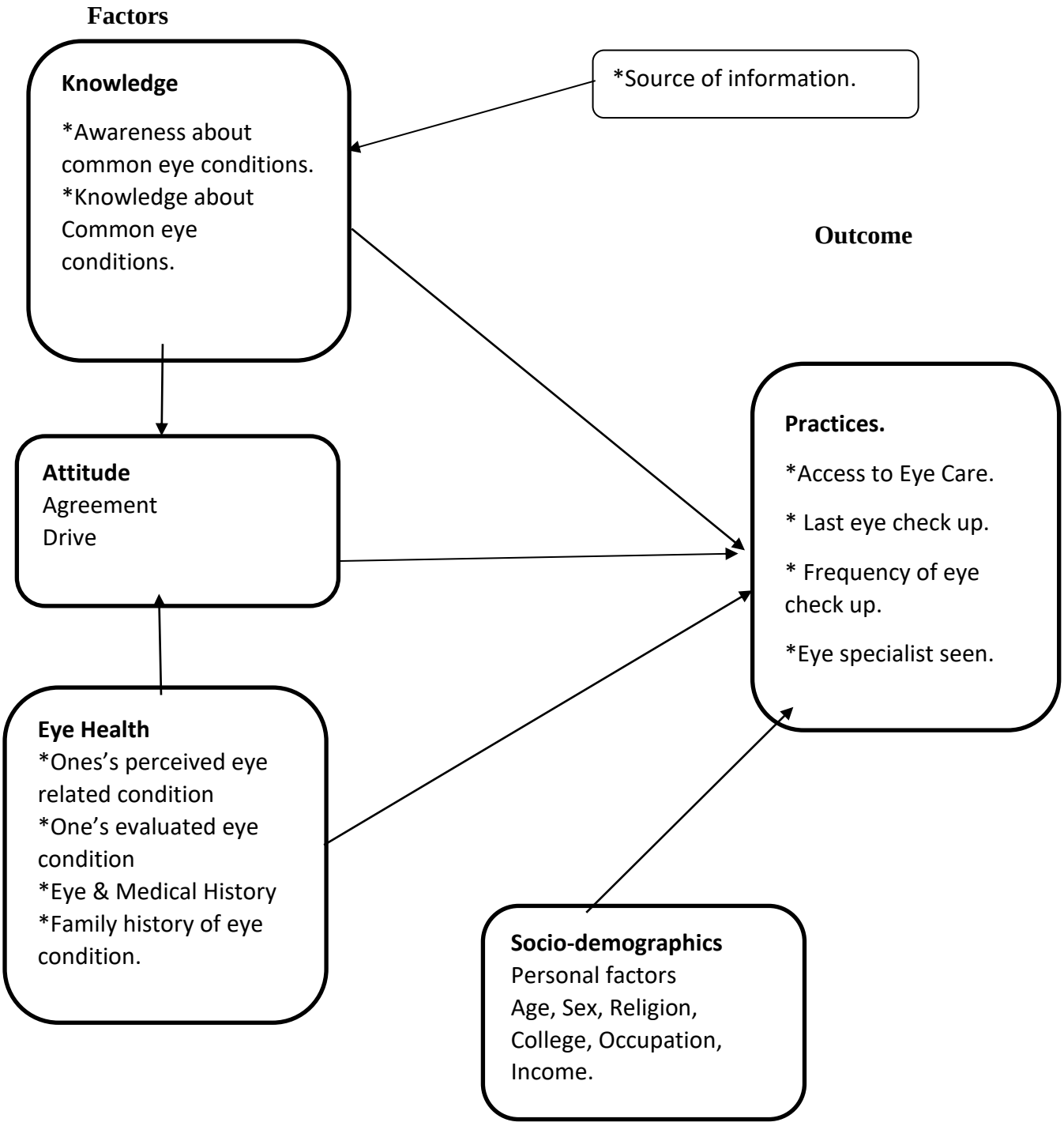

Figure 1: The Health belief Model (Janz & Becker, 1984; Rosenstock, 1974)

The health belief model (HBM)

The health belief model was developed in 1950s to understand the failure of people to adopt disease prevention strategies such as regular eye care or screening for the early detection of disease. The effectiveness of this action accounts for the likelihood of a person adopting a behavior. The health belief model was derived from psychological and behavioral theory and their components are health related as follows, 1) the desire to avoid illness or to get well if already ill; and 2) it assumes a specific health action will cure or prevent illness. What informs an individual's action is dependent on the person's perception of the benefits and barriers in relation to health behavior.

The HBM has six constructs, first four were the initial one and the latter two were added as research evolved.

1. Perceived susceptibility: it is when a person subjectively perceive their risk of acquiring a disease or illness, such as cataract, glaucoma and refractive error.

2. Perceived severity: how a person feels about the consequences of having a disease.

3. Percieved benefits: is a person's perception of the effectiveness of various actions available to cure a disease or to reduce the threat of illness and disease.

4. Perceived barriers, a person's feeling on the obstacles to performing a recommended health action. Eg Cost, Time involved in assessing eye health.

5. Cues to action is the stimulus required to trigger the decision making process, internally it could be eye discomfort, externally, it could be family history of eye disease, or information from newspaper article.

6. Self-Efficacy is the level of confidence a person has in his/her ability to successfully perform a behavior (Janz & Becker, 1984; Rosenstock, 1974).

Narrative to the conceptual framework

This framework was adopted from a theorized concept, all the six constructs have been adapted for this study:

It includes perceived susceptibility which is informed by knowledge. People may not see the need to use eyewear to correct their vision because they think wearing glasses is for people "who appear serious", glaucoma also do not have symptom so people may think they are not susceptible. Some perceive cataract as an old age disease so the youth may think they may never have the eye condition (perceived susceptibility), however they may have an eye condition that leads to blindness (perceived severity) this links and identify the motivational factors that influence the uptake eye care referred to as practice.

Socio-demographic data was directly measured from the responses to questions; it included age, sex, marital status, occupation, college, programme of study, religion and socioeconomic status. Personal eye related condition were derived from responses from the questionnare: what they generally perceive as the state of their eye health and medical diagnosis of any systemic condition.

History of eye condition as evaluated by a qualified eye personnel/specialist. Eye and medical history for conditions such as cataract, spectacle correction (refractive error), glaucoma, diabetes, hypertension, asthma, sickle cell. Information on family history of the eye conditions were collected.

Knowledge

Perceived susceptibility and perceived severity are constructs informed by the level of information one has about an eye disease. The study examined their awareness and knowledge about the disease, disease symptoms and the effect of the eye disease; cataract, refractive Error (Spectacle correction) and glaucoma, including the sources from which

they had the information about the eye condition of interest in the study. Measure of knowledge was based on the correct definition of the common eye conditions under study. The study attempts to find the perceived eye health of all study participant by categorizing the state of health from excellent to poor. It measures the participants' understanding, perception, simple but technical science of the common eye disease. Having knowledge may not mean that one will have regular eye checkup, eye health practice will be informed by the construct self efficacy. Finding the source of their information will help focus on the most effective means of disseminating information on eye health and its related in subsequent eye health education campaigns.

This knowledge was measured, and the source from which this information was derived can be used for health promotion to emphasize effective communication channel.

Attitude will be a person's perception about various eye intervention (perceived benefits). Attitude identifies the values people have about their eye health and the health care system. Attitude is influenced by knowledge.

Attitude in this study was the position of participants towards eye diseases and eye care. There were questions on their priorities or choice of preventing some selected conditions that causes disability identified from global burden of disease (GBD) protocol (Murray, 1996) Likert scales were also used.

Attitude was influenced by the knowledge about eye health care, the interaction between these factors may promote or obstruct the practice of eye care.

Practices

This construct cues to action that informs the practices of eye care, knowledge about eye health and understanding that some eye conditions are asymptomatic, family history of eye diseases are the cues to action, that what can motivate a person to practice eye care

regularly. The framework measuring practice, cost and time of accessing eye health can motivate or be barrier (perceived barrier). Agreement to access and utilize eye care frequently once a year will be a measure for regular eye check. Investigated to find those who went for their first year admission medical screening and also had their eyes checked. The state of one's health may account for factors that promote or obstruct practices of eye health care.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.0 Introduction

This chapter extensively review literature in relation to the objectives of the study. The focus were knowledge about eye conditions, attitude towards eye health care, practices of eye health care.

2.1 Overview of visual impairment and blindness

A recent population based study in Ghana, showed cataract (54.8%) was the leading cause of blindness followed by glaucoma (19.4%). The main cause of visual impairment reported was refractive error (44.4%) then cataract (42.2%). The prevalence of blindness was 0.74% and severe impairment 1.07% (Wiafe, 2015). Using Ghana's population statistics, it implies 200,000 people are blind and 290,000 are visually impaired.

In another clinic based study in Ghana, prevalence of visual impairment and blindness were 17.1% and 1.2% respectively, after spectacle correction, it reduced to 6.7% and 0.75% respectively (Budenz et al., 2012). Suggesting refractive error (RE) is one of the most common ocular conditions, and uncorrected refractive error (URE) is a major public eye health challenge (Naidoo et al., 2016).

2.1.1 Refractive Error

Refractive Error is how light focuses on the retina. There are four main classification of refractive errors: myopia, hyperopia, astigmatism, and presbyopia. Myopia is light focusing in front of the retina accounting for poor vision from far. Hyperopia is light focusing behind the retina. Astigmatism is caused by an error in the way light passes

through the cornea and the lens. Presbyopia is difficulty reading at near due to aging. They all result in blurry or distorted vision (Murphy et al., 2017) .

Recently, uncorrected refractive error has been identified as a cause of functional blindness and significantly impaired vision, from a population based study among adults, children and in post-cataract patients (Holden & Resnikoff, 2002). Globally, uncorrected refractive error is the leading cause of visual impairment and second leading cause of blindness. According to World Health Organization Global data on visual impairment, refractive error is responsible for 42% and 3% of visual impairment and blindness respectively in the world (WHO, 2013). Refractive errors are corrected with simple spectacles, contact lens or refractive surgery.

Studies have shown that refractive error accounts for 62.5% blindness (corrected vision< 6/60) (Maul, Barroso, Munoz, Sperduto, & Ellwein, 2000), 22% in Nepal (Pokharel, Gopal, Negrel, Domonique, Munoz, Sergio & Ellwein, 2019), and 75% in China (Zhao, Pan, Sui, Munoz, Sperduto, & Ellwein 2000). The more alarming reason is the uncorrected refractive errors on presentation– 46% in Chile, 92% in Nepal, 58% in China, 86% in rural India. The burden extends to developing countries, with uncorrected refractive error causing 25% of all blindness (<6/60) in an Australian adult population and 56% of visual impairment (<6/12) (Keeffe, Weih, Mccarty, & Taylor, 2002).

The burden of refractive error is set to grow at an alarming rate due to an increase in myopia both in the developed and developing world, most especially in urbanized East Asians, that is Chinese populations in Hong Kong, Singapore and Taiwan (Lau, Lee, Fan, & Michon, 2002; Perera et al., 2010).

Barriers to refractive services have been identified as lack of equipment, cost of spectacles, lack of motivation (Ntodie, Danquah, Kandel, & Abokyi, 2014).

2.1.2 Cataract

Cataract is the opacity of the crystalline lens, it can be congenital, age related or can be caused by trauma. Cataract is treated surgically to restore vision. It is the major cause of blindness in Ghana and it is more common among women than men. Cataract is one of the common conditions that manifests among diabetics (Konstantinidis et al., 2017). About half of the blindness in Africa, is caused by Cataract. It was estimated that bilateral cataract (affects both eyes) are estimated to be 0.5%. There is limited data on the incidence of cataract in Africa (Lewallen & Courtright, 2001).

2.1.3 Glaucoma

Glaucoma is a group of disease that affects the optic nerve. The group factors are a typical triad of a raised intraocular pressure (IOP) a key modifiable factor, optic nerve head damage and corresponding visual field defects. Africa-American race have been identified as a risk factor. It may be congenital or acquired. There are two types; open angles and closed angles.

Primary glaucoma is classified into;

1. Primary open angle glaucoma (POAG): there is increased optic nerve damage, intraocular pressure (IOP), corresponding visual field defects and open angles when gonioscopy is done.
2. Primary angle closure glaucoma typically are closed angles on gonioscopy (PACG) (Bowling, 2016; Dutta & Dutta, 2005). Glaucoma is the second leading cause of blindness worldwide.

The normal intraocular pressures in the eyes are 11-21mmHg (Bowling, 2016). Glaucoma accounts for 5.2million blindness or 13.5% of the people who are blind, the third largest cause of blindness (Roodhooft, 2002). 50% cases of glaucoma are undetected, it is prevalent among 2-3% of people aged 40years and above. Globally POAG is the most

common form to about 50% of all glaucoma cases, with higher incidence in black individuals.

In Africa, about 1% of the population have glaucoma and trachoma (Lewallen & Courtright, 2001). According to a study in Ghana, POAG is the most prevalent type of Glaucoma (7.7%). In a study in Central African Republic, glaucoma accounted for 12.7% cause of blindness (Potter, 1991). The risk of having glaucoma increases with age, but declines among those aged 80-90years because only few of them live that long. The onset of glaucoma have been established to be earlier in blacks than Caucasians. Of the 158 cases of glaucoma diagnosed 94.3% were open angled and the closed angle was 9 (5.7%). Ninety four percent cases of the glaucoma detected were not aware they had glaucoma (Ntim-Amponsah et al., 2004). There is no known cure for glaucoma, but using eye drops controls the intraocular pressure. Laser treatment and surgical procedures are options (Bowling, 2016). Meeting the basic need in developing countries such as Ghana is still a challenge. Investing in outreaches to identify people who are at risk but have not loss vision is more beneficial than managing people all their lives with low vision due to visual impairment (Guzek et al., 2005).

2.2 Impact of Blindness and visual Impairment

Of all the NCDs, blindness increases morbidity, diminishes the quality of life, and is one of the most devastating factors on health yet it has received little attention in health promotion globally and have been missing from the lists of the indicators of NCDs (Herring, 2004). NCDs have gained so much attention globally partly due to the high rate of mortality associated with conditions such as cancers, cardiovascular diseases (CVD), respiratory conditions and diabetes (Byfield, 2011; Chestnov, 2012), but blindness is not mentioned although enough evidence suggest a relationship between blindness and mortality. Vision impairment caused by glaucoma, cataract, and refractive error is the 6th

largest cause of Disability adjusted life years (DALYs) globally rated at 3% (Byfield, 2011). The social and economic impacts of blindness cannot be overemphasized (Fricke et al., 2018; K. Naidoo, 2007; Organisation(WHO), 2007).

Studies done among undergraduates in the three universities in Ghana showed the population level of knowledge of ocular disease was 34.7% (Kyei, Tettey, Asiedu, & Awuah, 2016). Several studies indicated knowledge of eye diseases is determined by the level of education (Attebo, Mitchell, Cumming, & BMath, 1997; De-gaulle & Dako-gyeke, 2016; Ilechie et al., 2013; Livingston, Lee, Paola, De Guest & Taylor, 1995; Livingston, McCarty, et al., 1998). Understanding this knowledge among the highest elite group is crucial.

2.3 Knowledge, Attitude, Practice Define

Knowledge is the capacity to acquire, retain and make use of information that utilizes a mixture of discernment, comprehension, skill and experience. **Attitude** is the tendency to react in a certain way to certain situations, to see and interpret events according to a certain predispositions, or being able to organize opinions into coherent and interrelated structures. **Practice** is applying rules and knowledge that results in action. Good practice is an art linked to the progress of knowledge and technology, effected in an ethical manner (Alemayehu, Belete, & Adimassu, 2018; Kaliyaperumal, 2004).

2.4 Eye health

The most common eye conditions glaucoma, cataract and diabetic retinopathy that lead to blindness are increasing (WHO, 2019). To reduce visual impairment in an aging community, timely eye examinations and appropriate treatment are necessary. Yet many people in the “at risk population” group frequently do not have regular and timely eye examinations to ensure early diagnosis and treatment. Appropriate eye health education

may encourage preventive eye health care, presenting an avenue for early diagnosis and treatment before visual loss occurs (Livingston, McCarty, et al., 1998).

American Academy of Ophthalmology (2015) recommend regular eye evaluation among high risk individuals based on race, age, family history, ocular and medical history even in the absence of any symptom. Eye examination was recommended every 1 to 2 years. However, a Visual Impairment Project found that half of the population sampled had not visited either an optometrist or ophthalmologist within the past 2 years.

In Ghana, eye health is more focused on the curative services than preventive services. With limited resources available in the health budget in Ghana, preventive medicine offers an economically and socially acceptable alternative to preventable visual impairment. The knowledge of an individual is an important predictor of behavioral change in the treatment of diseases blindness. Therefore, the implementation of health education encourages people in the community to have a regular checkup, this may identify those individuals who would otherwise be unaware or unable to obtain recommended examinations and treatment (Ebri & Govender, 2017). Thus, people with high level of education were more likely to have a better understanding of eye diseases glaucoma, cataract and refractive error.

Population growth is increasing, people are living longer so are more likely to report with old age related eye diseases such as cataract, diabetic retinopathy, age related macula diseases, hypertensive retinopathy, glaucoma which are the main causes of visual impairment and blindness (International Agency for the Prevention of Blindenss, 2010) increasing the demand for eye care. Previously, these conditions were common among the aged but currently some of these conditions are reported among the youth. This is as a result of sedentary lifestyle, that is typical of the middle class, it leads to obesity and overweight which can result to metabolic changes such as insulin resistance (diabetes),

increased blood pressure (hypertension) and high cholesterol (Boutayeb, 2016). Diabetes and hypertension affects the eyes and vision. In Switzerland, reported prevalence of eye condition among diabetics were refractive error 36.2%, cataract 35.8%, and glaucoma 12.6% (Konstantinidis et al., 2017). Similarly, self-reported eye conditions in Cambodia refractive error was 28.7% and cataract was 2.7% (Arnold, Ormsby, Keefe, & Morchen, 2011). Prolonged computer use causes eye related issues such as ocular pain, dryness sensation and ocular discomfort. Research reveals exposure to non-ionizing radiations emitted from the computer causes changes in the crystalline lens, that can lead to the development of cataract, a visual impairment (Ng, 2003).

Adults are in a better position to influence others to make the right decision. According to a study in America, almost all adults 96% are somewhat or very likely to seek eye care if encouraged by their primary care providers and seventy six percent (76%) indicated they will seek eye care if their family members ask them to do same (Edlow, 2008).

2.5 Eye health knowledge

Adults when they have adequate knowledge or information about a disease are generally able to make changes in attitude and adopt the right lifestyle to prevent the risk of having that disease when armed with adequate knowledge as explained amply by the health belief model (Rosenstock, 1974). Patient knowledge on eye diseases and utilization of eye care services promote preventive eye care subsequently reducing ocular morbidity.

Previous population studies suggest that people with high level of education have higher knowledge and awareness of eye diseases like glaucoma, cataract, age related macula diseases and night blindness. Sex, Age, Family history were significant factor of level knowledge of eye conditions (Aliyu, Suberu, & Muhammad, 2017; Shrestha et al., 2014).

Levels of education are identified as factors that motivate knowledge and attitude towards eye health (Arnold et al., 2011; Lau et al., 2002; Livingston, McCarty, et al., 1998; Teutsch et al., 2016). Some studies assert that level of education is not the only factor that influence knowledge and attitude about eye health but age, sex and known history of a family or close relative with such eye disease (Haddad, Bakkar, & Abdo, 2017; Shrestha et al., 2014). A survey on barriers to eye care in Cape Coast attributed poor access to eye care to illiteracy and poverty (Ocansey et al, 2014). Low awareness of common ocular conditions was associated with factors such as lower levels of education and rural habitation (Shrestha et al, 2014).

A study done among University of Malaya academic staffs in Malaysia reported the level of awareness and knowledge of eye diseases was limited. People with family history of eye diseases were more aware and more knowledgeable about eye diseases (Chew, Reddy, Ophth, & Karina, 2004). A study in China, indicated awareness of cataract and glaucoma were 89.9%, and 68.9% respectively. Among the people aware of each disease, their level of knowledge of cataract and glaucoma were 70.9% and 48.1% respectively. Educational level was identified as a factor influencing the rate of awareness of cataract and glaucoma, source of information was a factor that affected knowledge of each eye condition. The self-reported prevalence of the cataract, glaucoma were 78%, 1.1%, among the study participants, and 12.5%, 1.6%, 1.0% in the participants over 40. The proportions of the participants who have taken visual acuity test, intraocular pressure examination, and fundus examination were 72.1%, 17.9%, and 20.2% (Zhang, Gao, Pan, Luan, & Chen, 2016). A population study in Australia reported a gap in knowledge and understanding of eye diseases (Livingston, Mccarty, et al., 1998). Similar to a population study in Nepal, the overall knowledge for all ocular disease were 47.1% (Sapkota, Dulal, Sunu Poudyal, 2012)

A Survey on barriers to eye care in Cape Coast attributed poor access to eye care to illiteracy and poverty (Ocansey et al, 2014). Low awareness of common ocular conditions was associated with factors such as lower levels of education and rural habitation (Shrestha et al, 2014). A study done among University of Malaya academic staffs reported the level of awareness and knowledge of eye diseases was limited. People with family history of eye diseases were significantly more aware and more knowledgeable about the eye diseases under review (Chew et al., 2004). According to a study in Ghana, barriers to refractive error have been identified as lack of equipment, cost of spectacles, lack of motivation to uptake care (Ntodie et al., 2014).

2.6 Eye health Attitude

A study in Cambodia on knowledge, attitude on uptake of cataract surgery, in assessing attitude 80% agreed that cost can prevent one from seeking treatment whereas 18.3% disagreed. 66.7% of participants agree that fear of cataract surgical outcome can prevent seeking intervention whereas 28.3% disagreed. 73.3% agreed that lack of accessibility can prevent people from seeking treatment, only 1.7% disagree (Aliyu et al., 2017).

Another study in Australia that assessed attitude, participants were asked about disability conditions they prefer to prevent and 25% preferred to prevent total blindness first compared to cancer. For the question on preference to provide treatment for disability conditions, 60% prefer to provide treatment for total blindness first compared to stroke 16% (Livingston, McCarty, et al., 1998). In Nigeria attitude towards treatment and prevention of eye disorders and blindness was good (92%) and 91.4% rated blindness as their first priority to prevent (Onwibiko, Eze, Udeh, Okoloagu, & Chuka-Okosa, 2016). Socio-demographics were not significant factor of their attitude. Recent visit to an eye practitioner predicted good attitude (Onwibiko et al., 2016).

2.7 Practices of Eye health

Previous studies similar to this study, assessed practice of eye health care using frequency of eye check, the practitioner seen, or a visit to an eye care facility (Ichhpujani, Bhartiya, Kataria, & Topiwala, 2012; Konstantinidis et al., 2017; Lakhan & Sharma, 2010; Livingston, McCarty, et al., 1998). Reasons for poor practice stated were because they were not aware of the importance of preventive eye care. A study in India indicated 61.1% did not have periodic eye checkup (Srinivasan et al., 2017) whereas in another study in India among hospital personnel, only 42% had visited an eye specialist (Ichhpujani et al., 2012). In Switzerland, 70.5% have gone through an eye examination in the past 12 month, 87.0% in the past two years. Surprisingly 3.7% have never seen an ophthalmologist to screen for diabetic retinopathy (Konstantinidis et al., 2017). Compared to a study in Cambodia, self-reported prevalence of refractive error and cataract was 28.7% and 2.7% respectively (Ormsby et al., 2012).

The key components of primary eye care that was recommended and that require improvement include eye education, symptom identification, visual acuity measurement, basic eye examination, diagnosis and timely referrals (Murthy & Raman, 2009). Eye health education as an integral part of any comprehensive eye health care system, helps one to recognize eye health problems. This makes individuals able to adopt possible measures for their prevention, and ensures awareness about the avenues to obtain the service in case they need it by creating behavioral changes and creating demand for it. Health education, also motivates and guides people to come into action to bring about appropriate changes in their health related practices to achieve optimum level of eye health in the community (Sapkota, Dulal, Sunu Poudyal, 2012). Many factors such as age, sex, educational level and level of income have been identified to influence awareness on eye disease (Livingston, McCarty, & Taylor, 1998; Chew, Reddy, Ophth, & Karina, 2004;

Ilechie, Otchere, Darko-takyi, & Halladay, 2013). This implies the knowledge of the stakeholders must be adequate to influence a change in attitudes.

CHAPTER THREE

METHODS

3.0 Introduction

This chapter describes the research design and methodology used to access the knowledge level, attitude and practices of eye health care among University of Ghana Graduate students. The methodology and research design were informed by the objectives of the study. It entails the measurement of the variables in the research, sample and sampling design, data collection technique and ethical considerations.

3.1 Study Design

This study was a cross-sectional design utilizing quantitative methods.

3.2 Study location

The study was conducted on the University of Ghana, Legon campus. The University of Ghana is the oldest and largest of the eight public universities in Ghana. The university is made up of four colleges comprising; Basic and Applied Sciences, Education, Health Sciences and Humanities, nineteen schools, five institutes and eleven learning centers. Presently, the University offers teaching non-degree, Bachelor's degree and post-graduate degree programs. The student population is over 40,000; of which about 85.36% are undergraduates and 14.64% graduates. The enrolment ratio is about 1.4 males to 1 female (University of Ghana, 2016). As at 2018, there were 3,463 registered graduate students (Graduate School - UG, 2018).

3.3 Study population

The study was conducted among the University of Ghana Graduate students on the Legon main campus.

3.4 Sample size determination

An acceptable minimum sample size was calculated using the Yamane (1967:887) formula (Isreal, 2003):

$$n = \frac{N}{1+N(e)^2}$$

Where:

n = sample size

N = population size (3463 registered graduate students 2018/2019)

e = Level of precision at 5%

$$n = \frac{3463}{1+3463(0.05)^2}$$

n = 359

Allowing for non-response rate of 10%,= 35.9

Total Sample size was 395 approximately.

Using the sampling frame n/N, the estimated samples from each college will be 48 from college of basic and applied science, 41 from college of education, 43 from college of health sciences and 264 from college of humanities.

3.4.1 Inclusion criteria

All UG graduate students on University of Ghana main campus during the period of study.

3.4.2 Exclusion criteria

Ophthalmic professionals; Ophthalmologist, Optometrist, Ophthalmic Nurses, and Opticians were excluded from the study.

3.5 Sampling Procedure

A stratified random sampling was used, proportionate sampling process was employed to arrive at the sample size calculated. The data on the entire graduate student population was derived from the Graduate School. The total population of students in each college with their schools were retrieved from the four colleges in the university. Each college was identified and allocated as a strata, a sampling frame was derived using n/N and used to calculate the number of respondents expected from each college in the University. Using the estimated numbers from each college, the sampling frame was also calculated to determine the numbers from schools under each college. The final data was collected from the schools under each college.

To arrive at the expected numbers in each school the n^{th} was calculated using $\frac{N}{n}$ for each school where N is the total sample size calculated for the study and n is the estimated number per college, the n^{th} enumerated for all schools were all almost similar, approximated to 9^{th}, except the school of humanities that was 2^{nd}. Implying in the colleges of education, health science, basic and applied sciences every 9^{th} person was interviewed. Whenever the researcher starts the data collection, the 3^{rd} graduate student in the first school visited was selected after all the necessary information on the study was explained to the participant and the consent was taken. The 3^{rd} graduate student was selected as the first participant, then every 9^{th} graduate student the researcher met in every school were enumerated, when the expected numbers were arrived in each, the same process was repeated for the subsequent schools using the sampling frame calculated through all the colleges until the expected sample size was realized. Participant selection was done with replacement. For college of humanities their n^{th} was 2^{nd}, so every 2^{nd} person was interviewed but selection were same as the other colleges until estimated sample size was reached.

Dependent Variable

Practices of Eye health

Independent Variables

Knowledge about eye health

Attitude about eye health

General and Eye health information of UG Graduate Students

3.6 Data Collection and Instrument

Data were collected using questionnaires with closed ended and open ended questions, using previous studies as guide (Apio-adih, 2014; Livingston et al., 1998; Province, 2011; Zhang et al., 2016). The questionnaires were designed and administered in English Language, since all participants were elites, completed forms were checked to ensure all sections of the questionnaire were filled. The final data was collected, checked for completion and entered into the ODK mobile application for final data cleaning, editing and analyses.

3.6.1 Data Collection Instrument

The sections of questionnaire were as follows:

1. Demographic information
2. General health
3. Eye health
4. Health History
5. Health Insurance plan
6. Knowledge about eye disease
7. Information sources
8. Attitude and Eye examinations experiences.
9. Practices

3.7 Pre-test and Quality control

The questionnaire was pretested by the researcher among graduate students at the University of Professional Studies, Accra (UPSA) who have characteristics similar to the sample, this ensured clarity and accuracy. This also helped the researcher get familiar with the questionnaire. All the necessary corrections, modifications were made on the pretested documents.

3.7.1 Training of research assistants

The data collection was done with the assistance of two research assistants that were recruited and trained in a day, to ensure valid and reliable information from participants. The training included selection of sample, the ethics, information on study, how to seek informed consent of participants

3.8 Data Analysis

Data was entered into the ODK application then imported to the Statistical Package for Social Sciences (SPSS) version 22 software. Data was edited, cleaned, and formatted to ensure it was complete. Final data was analyzed using Stata Version 15. Frequencies and percentages were used to describe categorical variables. Mean and standard deviation were used in summarizing continuous variables. The bar chart and pie charts was used to pictorially describe some key categorical variables.

In measuring the level of knowledge of respondents on eye health, knowledge on cataract, glaucoma and refractive error were combined as overall knowledge. Correct answers were weighed as 1 and wrong answers scored 0.

The minimum and maximum score possible were 0 and 21 respectively. The study classified all respondents who scored below 10.5 as having poor level of knowledge and those who scored above 10.5 as having high level of knowledge.

In generating the attitude level of respondents towards eye care, 10 set of questions comprising 8 positive sentence and 2 negative sentence were asked using likert scales and the responses were weighed and scored accordingly, the agree were scored 3, neutral was scored 2, and disagree were scored 1, accounting for total highest score of 30. The negative sentences were reverse coded before results were analyzed. The minimum and maximum possible scores were 0 and 30 respectively. Respondents who scored 15 or below were classified as having poor attitude towards eye care whereas those that score above 15 were classified as having good attitude towards eye care.

Practice was scored according to the frequency of eye check of participants, responses were weight and scored to measure the practice of eye health care among participants., never checked was weighed 0, checked once scored 1, checked 1 to 3 times scored 2 and checked more than 3 times scored 2. The maximum score was 7 and the minimum sore of 0. Good practice were scores 4 to 7 and poor practice were scores 0-3. The Pearson chi-square was used to test association between categorical independent variables and the dependent variables. The binary logistic regression model was used to fit a univariate and multivariable regression model in identifying factors influencing the outcome variables. All statistical test in the study were at a 0.05 level of significance.

3.9 Ethical Consideration

The study protocol, procedures and tools were presented for ethical review, the Ghana Health Service Ethical Review Committee (GHS-ERC 044/02/19). In addition, permission was obtained from relevant authorities within the University. Further, each of the participants were given sufficient information about the study and given an opportunity to ask questions before the beginning of data collection. The principal investigator wrote introductory letters to the appropriate key stakeholders within the institution notifying them about the study.

Informed Consent

The consent form included the purpose of the study, a description of the type of data to be collected. The informed consent gave all of the relevant information to participants to decide whether to participate in the study. In obtaining and documenting informed consent, the investigators complied with applicable local and domestic regulatory requirements.

Confidentiality

All study records were kept confidential. No identifying information about respondents was collected. Data was securely stored under lock and key, making it accessible to investigators only. All study procedures were conducted in privacy and every effort was made to maintain confidentiality to the highest extent possible.

Benefits and Risks

There was no direct benefits to the enrolled participants in the meantime. Even though the study has not identified any clear risk associated with participation in this study, there may be minimal risk since the nature of some of the question invaded the privacy of the participants.

Compensation

No direct compensation was provided for participation in the study.

Conflict of Interest

The investigators declare that there were no conflict of interest.

CHAPTER FOUR

RESULTS

4.0 Introduction

The chapter 4 shows findings of the study and they answer the objectives of the study. This section provides summary of the socio-demographic characteristics of the study participants, the participants reported health and ocular history, their family's ocular and general health history, their knowledge, attitude and the practices of eye health among University of Ghana Graduate students. Data was collected from May 2019 to June 2019.

4.1 Socio-demographic characteristics of the participants

A total of 403 graduates students participated in the study, 237 male (58.8%) and 166 female (41.2%). The age of participants is ranged 20 to 60 years with majority (55.6%) of them between 20 and 29 year old, their mean age 30.6 and standard deviation 6.4 (Table 1). 93.3% of the participants were Christians and 6.7% were non-christians. The total number of graduate students who participated in the study per college are; Basic and applied sciences 50, Education 43, Health Science 44 and Humanities 266. Majority of participants are not married 67.7% and 32.3% are married (Table 1).

Table 1: Socio-demographic characteristics of participants

Characteristics	Frequency (N=403)	Percentage
Sex		
Male	237	58.81
Female	166	41.19
Age (age at last birthday)	30.6±6.4*	
20-29	224	55.58
30-39	135	33.50
>39	44	10.92
Marital status		
Not married	273	67.74
Married	130	32.26
College		
Basic & Applied Sciences	50	12.41
Education	43	10.67
Health Science	44	10.92
Humanities	266	66.00
Religion		
Christian	376	93.30
Non christian	27	6.70
Health Finance plan		
NHIS	228	56.58
Private HIS	57	14.14
Out of pocket	104	25.81
Other	14	3.47
Income		
Unemployed	137	34.00
Less than 500	5	1.24
500 to 1,000	32	7.94
1,000 to 2,000	97	24.07
2,000 -3,000	70	17.37
Above 3,000	62	15.38

* Mean (standard deviation)

4.2 Awareness of eye condition

Regarding awareness of eye conditions; glaucoma was 88.1% rated highest, and refractive error was the lowest 40.5%. About 4.5% of the participants have never heard about the eye condition in review (Table 2).

Table 2: Awareness of Eye Conditions

Eye Condition	Ever Heard (n)	Percentage (%)
Glaucoma	355	88.09
Cataract	250	62.03
Refractive error	163	40.45
Never Heard	18	4.5

%: percentage

4.3 Knowledge

The level of knowledge were scored as the correct answers based on disease definition, symptom identification and treatment of glaucoma, cataract and refractive error. Maximum expected knowledge score was 21, total score of 16 and above was good knowledge and scores below 16 was poor knowledge. The highest score among participants were 11.59 (55.1 %). The majority, 77.17% had poor knowledge. (Table 3), only 69 (17.1%) had good knowledge about eye health conditions (Table 3). However, 90.99% participants knew the worst effect of glaucoma, but only 31.83% could appropriately describe the first symptom that it manifests.

Table 3: Scores and Levels of knowledge and attitude towards eye health care among participants

Variable	Minimum	Maximum	Poor	Good	Mean	SD
Knowledge on cataract	0	6	≤3	>3	1.69	1.64
knowledge on glaucoma	0	11	≤5.5	>5.5	3.13	2.32
Knowledge on refractive	0	6	≤3	>3	2.51	1.8
Overall knowledge	0	21	≤10.5	>10.5	7.33	4.26
Attitude score	14	30	≤15	>15	25.55	2.59
Summary						
Knowledge	**n(%)**					
Poor	311(77.17)					
Good	92(22.83)					
Attitude						
Poor	69(17.12)					
Good	334(82.88)					

SD: standard deviation n(%) = frequency(percentage)

4.3.1 Sources of knowledge of participants about eye conditions

The commonest source of information on eye conditions is TV/Radio commercial 39.7% followed by health personnel office 35.5%, 4.5% of participants have never heard of the three conditions under study (Figure 2).

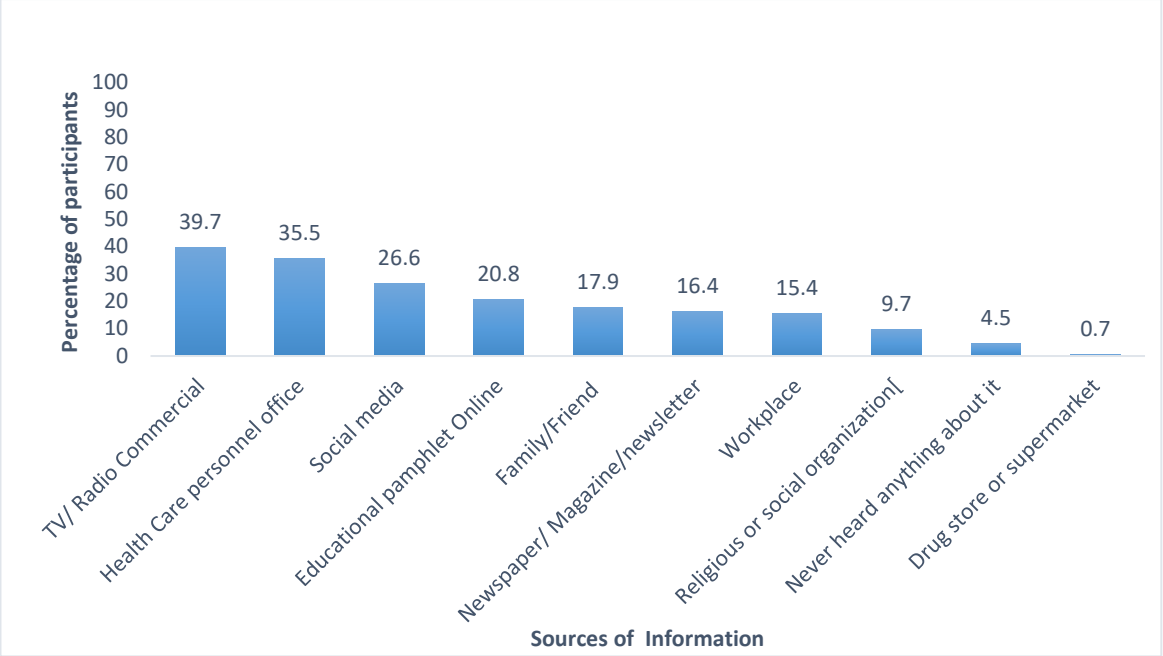

Figure 2: Sources of information

4.3.2 Knowledge and sociodemographic

The age (x^2 = 10.12; p = 0.006), marital status (x^2 = 4.46, p=0.035) and college (x^2 = 24.69; p<0.001) were significantly associated with the knowledge level of study participants (Table 4).

The percentage of good level of knowledge was significantly high among those in the age range 30-39 years (31.11%) and >39 years (27.27%) than those in the age range 20-29 years (16.96%). Significantly, the percentage of those who were married (29.23%) with high level of knowledge was higher than those who were unmarried (19.78%). Also, the percentage of people with good level of eye knowledge was significantly higher among students in the college of health sciences (52.27%) compared to those in the colleges of Basic and Applied Science (22.0%), Education (20.93%) and Humanities (18.42%) (Table 4). Participants were asked to rate their health, eye and vision (Table 4). Known history of some systemic diseases, family history of the eye condition of participants were not predictive of the level knowledge of participants.

Table 4: Level of knowledge of study participants

	Knowledge level			
Sociodemographic	**Poor n (%)**	**Good n (%)**	**chi-square**	**p-value**
Sex			3.62	0.057
Male	175 (73.84)	62 (26.16)		
Female	136 (81.93)	30 (18.07)		
Age			10.12	0.006**
20-29	186 (83.04)	38 (16.96)		
30-39	93 (68.89)	42 (31.11)		
>39	32 (72.73)	12 (27.27)		
Marital status			4.46	0.035*
Not Married	219 (80.22)	54 (19.78)		
Married	92 (70.77)	38 (29.23)		
College			24.69	<0.001*
Basic & Applied Science	39 (78)	11 (22)		
Education	34 (79.07)	9 (20.93)		
Health Science	21 (47.73)	23 (52.27)		
Humanities	217 (81.58)	49 (18.42)		
Religion			0.16	0.691
Christians	291 (77.39)	85 (22.61)		
Non-Christians	20 (74.07)	7 (25.93)		
Plan			5.45	0.142
NHIS	169 (74.12)	59 (25.88)		
Private HIS	42 (73.68)	15 (26.32)		
Out of pocket	88 (84.62)	16 (15.38)		
Other	12 (85.71)	2 (14.29)		
General and eye health				
Rate Health			0.002	0.969
Excellent	94 (77.05)	28 (22.95)		
Good	217 (77.22)	64 (22.78)		
Rate Vision			0.7	0.706
Excellent	81 (74.31)	28 (25.69)		
Good	209 (78.28)	58 (21.72)		
Poor	21 (77.78)	6 (22.22)		
Family history of glaucoma			1.85	0.396
Yes	16 (64)	9 (36)		
No	194 (74.05)	68 (25.95)		
Don't Know	53 (77.94)	15 (22.06)		
Family history of cataract			4.91	0.086
Yes	19 (65.52)	10 (34.48)		
No	98 (62.42)	59 (37.58)		
Don't Know	52 (77.61)	15 (22.39)		
Have history of glaucoma			0.29	0.593
Yes	12 (80)	3 (20)		
No	251 (73.82)	89 (26.18)		

n: frequency. %: row percentage. *: p-value <0.05

4.3.3 Factors that Influence knowledge

The binary logistic regression model was used to assess how socio demographics, participant's health and family history influence knowledge among the study participants. The measures of the level of significance in the study were p = 0.05, this section only included factors whose association from chi-square have p values < 0.1 to avoid too many variables on the tables. Age was statistically significant for those grouped 30-39years (COR=2.21; CI = 1.33-3.66) and not statistically significant when adjusted (AOR=1.48; CI= 0.69-3.2) when compared to those in the age group 20-29 years. Marital status was statistically significant (COR = 1.68; CI = 1.04 - 2.71) as the odds were higher for the married compared to those unmarried when other factors were not controlled for. Colleges of participants were statistically significant; the level of knowledge was higher among graduate students in college of health sciences (COR=3.88 95%CI 1.59-9.49). After other factors were controlled, the odds of high level of knowledge among students from college of health sciences remained significant (AOR=3.57; CI=1.17-10.89) meaning knowledge of students from health sciences were four times high compared to graduate students from other colleges.

Table 5: Factors influencing level of knowledge among study participants

	Unadjusted model		Adjusted model	
Variable	**COR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Sex				
Male	1.00 (reference)		1.00 (reference)	
Female	0.62 (0.38 - 1.02)	0.058	0.66 (0.35 - 1.22)	0.146
Age				
20-29	1.00 (reference)		1.00 (reference)	
30-39	2.21 (1.33 - 3.66)	0.002**	1.44 (0.67 - 3.09)	0.347
>39	1.84 (0.87 – 3.88)	0.112	0.71 (0.24 - 2.13)	0.545
Marital status				
Not married	1.00 (reference)		1.00 (reference)	
Married	1.68 (1.04 - 2.71)	0.036*	0.97 (0.45 - 2.10)	0.866
College				
Basic & Applied	1.00 (reference)		1.00 (reference)	
Education	0.94 (0.35 - 2.54)	0.9	1.06 (0.32 - 3.56)	0.923
Health Science	3.88 (1.59 - 9.49)	0.003**	3.57 (1.17 – 10.89)	0.025*
Humanities	0.8 (0.38 - 1.67)	0.554	0.92 (0.38 - 2.25)	0.862
Family history of cataract				
Yes	1.00 (reference)		1.00 (reference)	
No	1.14 (0.5 - 2.63)	0.751	1.13 (0.46 - 2.83)	0.786
Don't Know	0.55 (0.21 - 1.43)	0.218	0.66 (0.23 - 1.88)	0.439
Last visit to eye clinic				
Never	1.00 (reference)		1.00 (reference)	
1-6 months ago	1.88 (0.87 - 4.03)	0.107	1.15 (0.44 - 3.00)	0.775
7-12 months ago	1.71 (0.70 - 4.20)	0.238	0.99 (0.33 - 3.01)	0.992
1- 2 years ago	1.33 (0.52 - 3.45)	0.553	1.34 (0.41 - 4.38)	0.625
> 2 years..	0.68 (0.26 - 1.74)	0.418	0.63 (0.21 - 1.94)	0.421
Do not remember	0.47 (0.17 - 1.32)	0.154	0.35 (0.10 - 1.17)	0.087

COR: crude odds ratio. AOR: adjusted odds ratio. CI: confidence interval. *: p<0.05. **: p<0.01. ***: p<0.001

Figure 3 shows the distribution of condition for those on treatment or have ever been treated for any of the conditions. For all conditions investigated, all those who have ever been treated were more than those on treatment during the study.

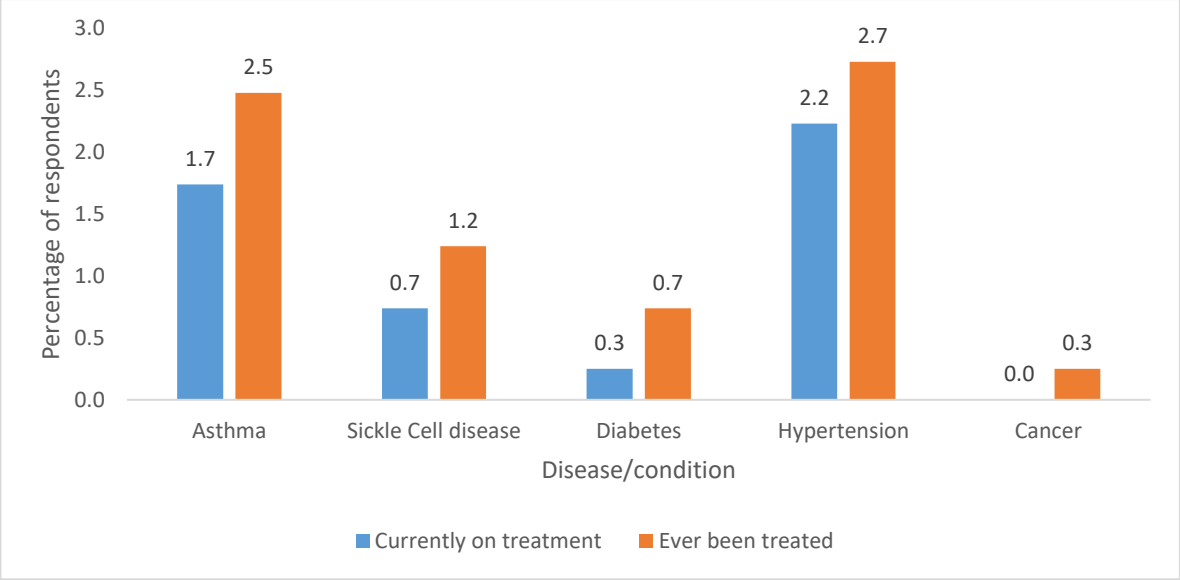

Figure 3: Medical history of study participants of condition related to the eyes

4.4 Attitude

Further measures of attitude toward eye health was done using a Likert scale. There were 10 statements, 8 positives and 2 negatives. The 2 negative statements were reversed coded before analysis was done. The scales used were disagree, neutral and agree. The expected maximum score was 30 ranging 0 to 30 scores, categorized as good attitude for scores above 15 and poor attitude for scores 15 and below. Poor attitude were scores 15 and below, good attitude were scores 16-30.

The mean attitude score on cataract, glaucoma and uncorrected refractive error was 25.55±2.59. Out of 403 graduate students 311 (82.88%) of them had good attitude toward eye health care (Table 3).

4.4.1 Attitude and health history

Participants were asked to rate their health, eyes and vision. The rating of vision was significant on their attitude towards eye health (x^2 =7.74; p = 0.0021), a person's perceived state of vision health is statistically significant to have good attitude toward eye health

care. The perceived state of one's health, family history of eye conditions were not significant predictors of good attitude toward eye health (Table 6).

Table 6: Attitude level by general health and eye health study among participants

	Attitude level			
Variable	**Poor n (%)**	**Good n (%)**	**chi-square**	**p-value**
Rate health			3.09	0.079
Excellent	27 (22.13)	95 (77.87)		
Good	42 (14.95)	239 (85.05)		
Rate Vision			7.74	0.021*
Excellent	28 (25.69)	81 (74.31)		
Good	37 (13.86)	230 (86.14)		
Poor	4 (14.81)	23 (85.19)		
Family history of glaucoma			2.03	0.362
Yes	4 (16)	21 (84)		
No	39 (14.89)	223 (85.11)		
Know	15 (22.06)	53 (77.94)		
Family history of cataract			3.38	0.184
Yes	3 (10.34)	26 (89.66)		
No	19 (12.1)	138 (87.9)		
Know	14 (20.9)	53 (79.1)		
Patient history of glaucoma			1.07	0.301
Yes	1 (6.67)	14 (93.33)		
No	57 (16.76)	283 (83.24)		

n: frequency. %: row percentage. *: p-value <0.05

4.4.2 Factors influencing attitude of Participants towards eye health.

Marital status was predictive factor of attitude (COR=1.89; CI = 1.02 – 3.50) in the unadjusted model but not statistically significant when other factors were controlled (AOR =1.54; 0.81 - 2.93) but suggests that those married are 54% more likely to have good attitude toward eye healthcare compared to those single. Participants rating of vision and health were not predictive factor of attitude when other factors were controlled. Those who rate their vision as good are more likely to have good attitude to practice eye health (COR = 2.15; 95%CI 1.24-3.73) when other factors were not controlled for. People with good attitude had 3 times higher odds of checking their eyes more often (COR=2.57 CI =1.04-3.55), became non-significant (1.98 CI =0.94-4.16) after other factors were

controlled for, a person have 98% odds of having good attitude to check the eyes in an eye care facility more than three times (Table 7).

Table 7: Predictive factors influencing attitude level of study participants

	Unadjusted model		Adjusted model	
Variable	**COR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Marital status				
Not married	1.00 (reference)		1.00 (reference)	
Married	1.89 (1.02 - 3.50)	0.042*	1.54 (0.81 - 2.93)	0.192
Rating of health				
Excellent	1.00 (reference)		1.00 (reference)	
Good	1.62 (0.94 - 2.77)	0.08	1.03 (0.49 - 2.14)	0.939
Rating of the eye				
Excellent	1.00 (reference)		1.00 (reference)	
Good	2.15 (1.24 - 3.73)	0.007**	1.98 (0.94 - 4.16)	0.073
Poor	1.99 (0.63 - 6.25)	0.24	1.53 (0.41 - 5.75)	0.531
Number of check-ups				
Never	1.00 (reference)		1.00 (reference)	
Once	1.04 (0.47 - 2.28)	0.92	1.08 (0.42 - 2.77)	0.87
1-3 times	1.32 (0.61 - 2.88)	0.482	1.18 (0.43 - 3.21)	0.745
More than 3 times	2.57 (1.12 - 5.9)	0.026*	1.98 (0.67 - 5.82)	0.216
Last visit to eye clinic				
Never	1.00 (reference)		1.00 (reference)	
1-6 months ago	2.23 (0.92 - 5.43)	0.078	1.23 (0.39 - 3.8)	0.725
7-12 months ago	1.83 (0.62 - 5.39)	0.271	0.96 (0.26 - 3.59)	0.955
1- 2 years ago	0.85 (0.32 - 2.23)	0.742	0.55 (0.17 - 1.77)	0.315
More than 2 years ago	1.19 (0.48 - 2.94)	0.711	0.91 (0.3 - 2.74)	0.871
Do not remember	0.67 (0.28 - 1.57)	0.352	0.6 (0.22 - 1.61)	0.308
Knowledge level				
Poor	1.00 (reference)		1.00 (reference)	
Good	3.64 (1.52 - 8.71)	0.004**	3.34 (1.36 - 8.21)	0.009**

COR: crude odds ratio. AOR: adjusted odds ratio. CI: confidence interval. *: p<0.05. **: p<0.01. ***: p<0.001

4.5 Eye health practice

This section of the study assesses the practice of eye healthcare among the participants, the section review the frequency of eye check-up, choice of treatment when there is an eye problem and visiting a health practitioner. Practice of eye health were based on the frequency of eye check, last eye check up and being seen by an eye practitioner.

Participants who went for the school medical screening were 66.5%, of which 91.8% checked their eyes.

In Table 8, participants were asked what they did when they last had an eye problem, 22.33% did nothing about it, 30.0% of the participants were at the hospital and 29.5% visited an eye facility for eye care. Nine percent either self-medicated or visited a pharmacy.

The frequency of eye care services among participants reported 11.14% have never checked their eyes before. Of 346 who ever checked their eyes 23.6% checked their eyes once, 28.5% checked 1 -3 times, the highest majority of 33.8% checked more than 3 times (Table 9). Ninety one percent of them recall checking their visual acuity (read letters from a chart), only 21.1% had Intraocular (Eye) pressure checked and 35.5% did fundus examination (looked inside the eyes) Table 8.

Table 8: Treatment options for eye problem

	Frequency	Percentage %
The last time you had an eye problem what did you do?		
Nothing	90	22.33
Visited a hospital	121	30.02
Visited an eye clinic	119	29.53
Visited a traditional healer	2	0.50
Visited a pharmacy	23	5.71
Self-medicated	16	3.97
Other	12	2.98
Never had an Eye problem	20	4.96
Frequency of eye checkup		
Never	57	14.14
Once	95	23.57
1-3 times	115	28.54
More than 3 times	136	33.75
Eye test done		
Visual Acuity (read letters from a chart)	369	91.56
Intraocular (Eye) pressure check	85	21.09
Fundus examination(Looked inside)	143	35.48

4.5.1 Eye care practices among study participants

Responses were weighted and scored to measure the practice of eye health care among participants. The maximum score was 7 and the minimum sore of 0. Good practice were scores 4 to 7 and poor practice were scores 0-3. Of the 403 study participants, eye care practice was poor among 32.0% (n=129) of the study participants (Table 9).

Table 9: Eye care practices among study participants

Eye care practices	Frequency	Percentage
Number of visits to eye care clinic		
Never	57	14.14
Once	95	23.57
1-3 times	115	28.54
More than 3 times	136	33.75
Last time visited eye care clinic		
Never	55	13.65
1-6 months ago	119	29.53
7-12 months ago	50	12.41
1- 2 years ago	44	10.92
More than 2 years ago	69	17.12
Do not remember	66	16.38
Eye care provider		
Ophthalmologist	76	18.86
Optometrist	85	21.09
Ophthalmic nurse	29	7.20
Optician	49	12.16
General Practitioner	27	6.70
Don't Know	137	34.00
Eye care practice level		
Poor	129	32.01
Good	274	67.99

4.5.2 Association between eye health practice and demographic characteristics of respondents

The Pearson's chi-square test was used to assess the association between demographic characteristics of respondents and the eye care practice of respondents. Sex of respondents (χ^2 = 5.84, p-value = 0.016), Age group (χ^2 = 8.46, p-value = 0.015) and college of respondents (χ^2 = 8.04, p-value = 0.045) were the demographic factors significantly associated with practice of eye care. (Table 10)

Table 10: Eye care practice level by demographic characteristics study participants

	Practice			
Variables	**Poor n (%)**	**Good n (%)**	**Chi-square**	**P-value**
Overall practice	**129 (32.01)**	**274 (67.99)**		
Sex			5.84	0.016*
Male	87 (36.71)	150 (63.29)		
Female	42 (25.3)	124 (74.7)		
Age group			8.46	0.015*
20-29	83 (37.05)	141 (62.95)		
30-39	39 (28.89)	96 (71.11)		
>39	7 (15.91)	37 (84.09)		
Marital status			2.28	0.131
Unmarried	94 (34.43)	179 (65.57)		
Married	35 (26.92)	95 (73.08)		
College			8.04	0.045*
& Applied Science	17 (34)	33 (66)		
Education	13 (30.23)	30 (69.77)		
Health Science	6 (13.64)	38 (86.36)		
Humanities	93 (34.96)	173 (65.04)		
Christians			1.01	0.314
Christians	118 (31.38)	258 (68.62)		
Non-Christians	11 (40.74)	16 (59.26)		
Health finance plan			4.23	0.237
NHIS	74 (32.46)	154 (67.54)		
Private HIS	12 (21.05)	45 (78.95)		
Out of pocket	38 (36.54)	66 (63.46)		
Other	5 (35.71)	9 (64.29)		

n: frequency. %: row percentage. *: p-value <0.05. **: p-value <0.01.

4.5.3 Eye care practice by knowledge, attitude, general health and eye health study among participants.

The Pearson's Chi-square test was also used to assess the association of other eye related factors and eye care practice. From table 11 below, Knowledge level (χ^2 = 11.71, p-value = 0.001), Attitude level (χ^2 = 6.38, p-value = 0.012), rate of vision (χ^2 = 14.35, p-value = 0.001), family history of glaucoma (χ^2 = 10.16, p-value = 0.006) and family history of cataract (χ^2 = 10.16, p-value = 0.006) were factors significantly associated with eye care practice level of respondents.

Table 11: Eye care practice level by knowledge, attitude, general health and eye health study among participants

	Practice			
Variables	**Poor n (%)**	**Good n (%)**	**Chi-square**	**P-value**
Knowledge level			11.71	0.001**
Poor	113 (36.33)	198 (63.67)		
Good	16 (17.39)	76 (82.61)		
Attitude level			6.38	0.012*
Poor	31 (44.93)	38 (55.07)		
Good	98 (29.34)	236 (70.66)		
Rate of health			0.47	0.493
Excellent	42 (34.43)	80 (65.57)		
Good	87 (30.96)	194 (69.04)		
Rate of vision			14.35	0.001**
Excellent	45 (41.28)	64 (58.72)		
Good	83 (31.09)	184 (68.91)		
Poor	1 (3.7)	26 (96.3)		
Family history of glaucoma			8.72	0.013*
Yes	3 (12)	22 (88)		
No	78 (29.77)	184 (70.23)		
Know	29 (42.65)	39 (57.35)		
Family history of cataract			10.16	0.006**
Yes	9 (31.03)	20 (68.97)		
No	35 (22.29)	122 (77.71)		
Know	29 (43.28)	38 (56.72)		
Ever diagnosed of glaucoma			2.28	0.131
Yes	2 (13.33)	13 (86.67)		
No	108 (31.76)	232 (68.24)		

n: frequency. %: row percentage. *: p-value <0.05. **: p-value <0.01.

4.5.4 The influence of knowledge and attitude on eye care practices of participants

The binary logistic regression model was also used to assess the influence of knowledge and attitude level of respondents on eye care practices of respondents.

From the unadjusted binary logistic regression model, respondents with good level of knowledge towards eye care had significantly higher odds (COR: 2.71, 95% CI: 1.51-4.87, p-value = 0.001) of having good eye care practices compared to respondents with poor level of knowledge towards eye care. From the adjusted model, the odds of having good eye care practices was also significantly higher for those with good level of knowledge towards the eye compared to those with poor level of knowledge towards eye care (AOR: 2.58, 95% CI: 1.22-5.45, p-value = 0.013).

From the unadjusted binary logistic regression model, respondents with good attitude towards eye care had significantly higher odds (COR: 1.96, 95% CI: 1.16-3.34, p-value = 0.012) of having good eye care practices compared to respondents with poor attitude towards eye care. From the adjusted model, the odds of having good eye care practices was not significantly different for those with good attitude towards the eye compared to those with poor attitude towards eye care (AOR: 1.50, 95% CI: 0.64-3.55, p-value = 0.352) (Table 12).

Table 12: The influence of knowledge and attitude level on the practice of eye care of respondents

	Unadjusted model		Adjusted model	
Variables	**COR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Knowledge level				
Poor	1.00 (reference)		1.00 (reference)	
Good	2.71 (1.51 - 4.87)	0.001**	2.58 (1.22 - 5.45)	0.013*
Attitude level				
Poor	1.00 (reference)		1.00 (reference)	
Good	1.96 (1.16 - 3.34)	0.012*	1.5 (0.64 - 3.55)	0.352
Sex				
Male	1.00 (reference)		1.00 (reference)	
Female	1.71 (1.1 - 2.65)	0.016*	2.18 (1.07 - 4.46)	0.032*
Age group				
20-29	1.00 (reference)		1.00 (reference)	
30-39	1.45 (0.91 - 2.3)	0.114	1.81 (0.87 - 3.75)	0.112
40-49	3.11 (1.33 - 7.3)	0.009**	3.08 (0.99 - 9.62)	0.053
College				
Basic & Applied Science	1.00 (reference)		1.00 (reference)	
Education	1.19 (0.5 - 2.85)	0.699	0.77 (0.2 - 3.03)	0.708
Health Science	3.26 (1.15 - 9.24)	0.026*	1.03 (0.26 - 4.13)	0.97
Humanities	0.96 (0.51 - 1.81)	0.896	0.75 (0.29 - 1.92)	0.544
Rating of vision				
Excellent	1.00 (reference)		1.00 (reference)	
Good	1.56 (0.98 - 2.47)	0.059	1.67 (0.81 - 3.46)	0.167
Poor	18.28 (2.39 - 139.66)	0.005**	16.01 (1.82 - 141.01)	0.012*
Family history of glaucoma				
Yes	1.00 (reference)		1.00 (reference)	
No	0.32 (0.09 - 1.11)	0.072	0.43 (0.08 - 2.28)	0.32
Don't Know	0.18 (0.05 - 0.67)	0.01*	0.18 (0.03 - 1)	0.05
Family history of cataract				
Yes	1.00 (reference)		1.00 (reference)	
No	1.57 (0.66 - 3.75)	0.312	1.77 (0.57 - 5.43)	0.321
Don't Know	0.59 (0.23 - 1.48)	0.262	1.03 (0.33 - 3.18)	0.961

COR: crude odds ratio. AOR: adjusted odds ratio. CI: confidence interval. *: p<0.05. **: p<0.01. ***: p<0.001

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter presents the discussion, conclusion and recommendations of this study. This study sought to ascertain the knowledge and attitude towards eye health care, and to determine how they relate to the practices of eye health care among graduate students in University of Ghana, Legon. The discussion shall explain the findings of the study.

5.2 Discussion

Not very many studies have been conducted to assess the knowledge, attitude and practices of eye health care among university graduates in Ghana. Most studies have concentrated on either glaucoma or cataract, but not the three (glaucoma, cataract and refractive error) (Chew et al., 2004; Haddad et al., 2017; Lau et al., 2002). This study was an attempt to evaluate the knowledge, attitude and practices of eye health care among graduate students of the University of Ghana.

The findings of this study revealed that there is poor knowledge level among the students on eye health care. This is consistent with study by Ofosu, Osei, Biekro, Hagan, & Awedoba (2018) which indicated that knowledge about some specific eye diseases like cataract, refractive error, glaucoma and trachoma was poor. A study by Shickle et al., (2014) identified that knowledge about eye disease varied, and even amongst medical students, people don't really realise the dangerous eye conditions you can get that need to be monitored. Similarly a study by Irving, Sivak, & Spafford (2018) found notable gaps in knowledge of eye care and sight risks. Participants' knowledge appeared most often to have been obtained from personal experience rather than as the result of any systematic

educational initiative. If these gaps result in fewer eye examinations, they potentially contribute to increased risk of vision loss due to later stage detection. The level of knowledge of graduates was assessed based on demographic characteristics. Age was discovered to be a statistically significant factor on the level of knowledge of graduates of the University of Ghana ($p<0.017$) but a similar study in Australia on cataract was significant for sex but not age (Lau et al., 2002). In addition, the college of these graduates was statistically significant in determining level of knowledge on eye health care ($p<0.001$). What may account for the good knowledge among most graduate students (52.27%) in the College of Health Sciences compared to the other colleges that had less than 23% may be because most of them had medical background and may have studied or heard about the conditions during schooling or their routine clinical care. A statistically significant association was discovered between marital status and level of knowledge among respondents [COR=1.65(95% CI: 1.02-2.67); p=0.041].

No significant association was found between sex, religion and health insurance plan. However, findings by Islam et al. (2015) found a significant association between level of knowledge and religion and gender. They discovered that more Muslims than Christians had knowledge about eye conditions. Their findings may be attributed to the fact that the study was conducted in Bangladesh, a predominantly Muslim population (Nabi, Islam, & Akter, 2015). This implies that it is critical to improve outcomes for students by bringing vision screenings and eye health education to schools.

The level of awareness for glaucoma and cataract were 88.09% and 63.03% respectively, comparatively higher than other population studies in India that was 77.7% and 40% respectively and Jordan was 38.5% for both glaucoma and cataract (Haddad et al., 2017; Shrestha et al., 2014).

The results of this study proved that awareness of eye conditions were high but the level of knowledge among University of Ghana graduate students was poor (77.17%), similar with study conducted in the University of Malaya to assess awareness and knowledge of common eye diseases (Chew et al., 2004). This may be because hearing about an eye condition is simpler than knowing the definition, symptom and treatment of the condition. Knowledge of eye disease in an Australian population study was 77% (Livingston, McCarty, et al., 1998) higher than the outcome of this study, possibly due to the fact that the definition provided in the study were specific and scientific, unlike the Australian study that accepted 'film over the eye' as correct definition for cataract. A similar population study in Nigeria reported level of knowledge about eye conditions (Onwibiko et al., 2016) similar to the finding of this study because both studies criteria to get the definition for a condition correct was specific. A study by Arinze (2015) identified poor awareness of availability of eye care services, fatalistic attitudes were the participants' main barriers to accessing eye care services. This is similar to the findings Ekpenyong & Ikpeme (2009) where lack of awareness constituted a major barrier to utilization of eye care services. This implies that involving persons with high level of education who are more aware of blinding eye condition are in a better position to educate others, families and closed loved ones.

However, the student's attitude towards eye health care was good. This can be attributed to the fact that majority of the students were aged between 20-29 years. Similarly a study by Onwibiko et al., (2016) revealed that participants' had a positive attitude towards prevention and treatment of eye disorders and blindness. Awareness of glaucoma was higher than cataract and refractive error since 2015, every annual world glaucoma week all the eye professional bodies actively create awareness on glaucoma through TV/ Radio commercial that may account for the high level of awareness of the condition compared to cataract and refractive error.

This further confirmed why radio/ TV commercial were the highest source of information for the eye conditions in this study. Eye conditions have been documented to be predominant among the older generation, especially those above 40 years of age (Salvi et al., 2016). Results of this study are also consistent with the findings from a study in India (Datta, Bhardwaj, Patrikar, & Bhalwar, 2009). No significant association was discovered between attitude and demographic characteristics of respondents. Islam and colleagues discovered a significant association between attitude level and gender (Islam et al., 2015). A study conducted in Nigeria, establishing a positive attitude by respondents (Onwibiko et al., 2016). This can be attributed to the fact that visual impairment affects the quality of life, quality of dwelling and well-being, and they become totally dependent on how they live their lives (Rooney, Hadjri, Rooney, Faith, & Craig, 2018).

Based on the influence of knowledge and attitude on practice of eye health care, the study results, indicated good level of knowledge towards eye care to have significantly higher odds of good eye care practices compared to respondents with poor level of knowledge towards eye care. This is contrary with study by (Onwibiko et al., 2016) which identified that majority of the participants had a positive attitude despite their deficiencies in knowledge. The healthy attitude is probably attributable to intrinsic fear of blindness and this should be encouraged by empowering the public with good knowledge of eye health through promotive and preventive eye care intervention. The rating of one's vision health was a significant factor of knowledge of disease on practice of eye health care suggesting that the perceived state of one's vision accounts for the level of knowledge he would have about their health conditions. Since most participants in this study prefer to prevent total blindness than to be blind to provide treatment and support for it as a disability, this calls for action to include low vision and blindness prevention into the national agenda.

Furthermore a study by Faal & Gilbert (2015) confirmed that after death and cancer, people fear blindness so much.

The use of eye wear among graduate students to correct the different types of refractive errors was 36.2%, higher than Ghana population study that reported eye wear correction of only 5% (Wiafe, 2015). The most reported purpose of the spectacle use among participants were computer use (32.9%) and distance vision (32.2%), confirming the visual demand of academic work, computer use, are high among graduate students so their ocular discomfort will manifest and cannot be ignored.

5.3 Limitation of Study

The study entails participants reporting their medical health and vision history, family ocular history, last time eyes were checked and this may account for recall bias.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Majority of the respondents had good attitude towards eye health care and but demonstrated poor knowledge about eye conditions. Demographic factors that were found to influence level of knowledge among respondents included age and the college the students belonged to. Many of the students with increased level of knowledge were from the College of Health Sciences. The college with the poorest level of knowledge among the respondents was the College of Humanities. Level of knowledge was also discovered to be high among respondents who have ever visited the eye clinic. Visit to the eye clinic influenced level of attitude of respondents. Factors that influenced attitude level included marital status of respondents and the increased number of times they had had their eyes checked.

Overall, the level of knowledge among respondents was found to be low and attitude was high. But awareness of glaucoma was high among participants, awareness for cataract 62.0% in this study.

Predictors of motivation to patronize eye care facility are affordability and expertise of professionals. The government must continually work on health financing to eliminate cost as a barrier to health care.

The significant level of knowledge among different college is possibly because most students in the health sciences have health background, and may have had information about glaucoma, cataract and refractive during school or during their line of duty.

Good level of knowledge on glaucoma, cataract and refractive error, leads to good attitude towards eye healthcare accounting for good practice of eye healthcare and vice versa when other factors are controlled, knowledge remained strongly significant statistically implying when one has knowledge about eye conditions they are 2.34 times likely to have good attitude and will have good practice. Despite other population studies attributed high level knowledge of eye diseases among people with high level of education, but the outcome of this study found otherwise, therefore the assumption that people with high level of education have good knowledge is not reliable.

6.2 Recommendations

The top most motivation to patronize an eye care facility were cost of services and expertise of health care personnel. Majority of participants have the National Health Insurance Scheme (NHIS) cards. It imply the government must continually work on health financing to eliminate cost as a barrier to eye health care.

Graduate students who ever checked their eyes remember checking their visual acuity (read letters from a chat), but most of them did not check their eye pressure, or had done fundus examination (looked into the eyes), this calls for the need to create awareness among health professionals to provide comprehensive eye care for all persons that visit the eye facility especially the at risk group. There is also the need for further research into the satisfaction of eye care services among people with high level of education in Ghana.

In addition to community outreaches, the poor level of knowledge among graduate students suggests rigorous health education and information dissemination activities that must target university community in Ghana especially the graduate students to ensure preventive eye health.

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APPENDICES

Appendix I: Participants Information Sheet

Study Title: KNOWLEDGE, ATTITUDE AND PRACTICES OF EYE HEALTH CARE AMONG UNIVERSITY OF GHANA GRADUATE STUDENTS

Introduction

Who is doing this research and why?

Good morning/evening.

I am [**Name of Research Assistant**] and part of a team of research assistants assisting Perfect Emefa Titiati, a Master of Public Health student at the School of Public Health, University of Ghana. We invite you to take part in a research project entitled: **Knowledge, attitude and practices of eye health care among University of Ghana graduate students.** Data for this research will be collected by one of the members of the research team. We are gathering data on the title stated above.

Another member of the research team, who will be observing and taking detailed notes during the data collection process, may accompany the research assistant. We will however, want to get your consent for participating in the study. This process will give you a basic idea of what the research is about and what your participation will involve.

Background and purpose of research.

Access to healthcare has been recorded as only 30% in Africa. The demand of academic work and technology accounts for longer hours spent reading books and working behind the computer. Clinically cases of reversible blindness report but rather late, this accounts for increasing trend of blindness. Adults are responsible for their health, and are in the position to counsel family members, close relatives to adopt the best attitude towards health including the eye. Graduate students in common have the highest level of education

according to educational ranking. Understanding the perception of graduate student about eye health is relevant to guide messages and health promotions.

Nature of the study

It is a quantitative study designed, using questionnaire to gather information on the knowledge, attitude and practices of eye health and common eye diseases among University of Ghana graduate students on the legon campus.

Participants' involvement:

What should I expect during my participation?

A research assistant will explain the nature of the study to you and any questions may be addressed. You will sign two copies of the consent form to indicate your consent to participate in the study, your copy will have your initials and a form code.

Participants

All UG graduate students except eye health personnels such as ophthalmologist, optometrist, ophthalmic nurses and opticians.

What are the potential risks of participation?

There is minimal risk that is the time spent in providing us responses to the questionnaires, some of the questions may appear personal. The research team will take reasonable safeguards to minimise potential risks. If you experience psychological distress or other discomforts as a result of your participation in this study, please contact the principal investigator listed below.

Possible benefits?

There are no direct benefits to you for participating in this research. The knowledge gained from this research will provide independent data that to inform regulations and interventions to eye health.

Costs

The cost of credit spent when called will reimbursed by the researcher.

Compensation for Participation?

There will be no compensation for your participation. However we would appreciate your time to help us examine the extent of knowledge about common eye diseases.

Privacy and the confidentiality of my research records be protected?

The confidentiality of data collected from you will be maintained by keeping identities and research records anonymous, storing data securely and making it accessible to investigators only, and removing identifiers and using a pseudonym to protect your identity.

Can I refuse to participate in this research?

Yes, you can, your participation is voluntary and you have the right to withdraw from the study anytime without penalty and without having to give any reasons.

Outcome and Feedback

The outcome of this study will be presented to the University.

Funding information

The cost of this study is self-funded by the Principal Investigator.

How long will my data be kept by the researchers?

In accordance with Local Research Data Management Policy, the research data will be retained for 5 years in case the original data set needs to be referred to in the future.

Sharing of participants information/Data

Data generated from the study is solely for the principal investigator and will be kept for 5years. If the data is still useful for another study clearance will be sought from GHSERC.

Who to contact for further clarification/Question?

If you have a complaint or you wish to seek further clarification, please contact:

Principal Investigator:

Dr Perfect Emefa Titiati,

Department of Social and Behavioural Science,

School of Public Health, University of Ghana

Box LG 13

Email: emefalin@yahoo.co.uk **Telephone:** +233 (0) 243286000

Administrator at the Ghana Health Service Ethical Review Committee Office:

Madam Hannah Frimpong, between the hours of 8am-5pm or

Email address: Hannah.Frimpong@ghsmail.org **Telephone:** 0507041223

Appendix II

CONSENT FORM

Study Title: KNOWLEDGE, ATTITUDE AND PRACTICES OF EYE HEALTH CARE AMONG UNIVERSITY OF GHANA GRADUATE STUDENTS, LEGON CAMPUS.

PARTICIPANTS STATEMENT

I acknowledge that I have read the purpose and contents of the participants' information sheet and satisfactorily explained to me in English language. I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name/Initials of Participant …… ID. Code……

Participants signature……

Date……

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarification raised by the participant have been addressed.

Researchers Name:……..

Signature:…….....

Date:…….....

Appendix III

Questionnaire

This questionnaire is to gather information/data for the study of knowledge, attitude and practices of eye health care among graduate students on UG main campus. Please answer these questions as sincerely as you can. We assure that your confidentiality will be protected and information will be used only for the purposes of the study. Thank you.

Kindly tick box [ ] or write where appropriate.

	BACKGROUND	**RESPONSE**	
A1	Sex	1 Male [ ] 2 Female[ ]	
A2	Age at last birthday	.....	
A3	Programme of study	Masters of …….	
A4	Occupation /Rank	Please specify…….	
A5	Marital status	**1.**Single [ ] **2.**Married [ ] **3.**Divorced/Separated [ ] **4.**Widowed [ ] **5.**Other (specify)……..	
A6	Religion	**1.**Christian [ ] **2.**Moslem [ ] **3.**Traditional [ ] **4.**Other (specify) …….	
A7	Health finance plan	**1.**NHIS [ ] **2.**Private HIS [ ] **3.**Out of pocket [ ] **4.**Other (specify) …….	
A8	Income	1.Unemployed [ ] 2.Less than 500[ ] 3.500 to 1,000[ ] 4.1,000 to 2,000[ ] 5.2,000 -3,000[ ] 6.Above 3,000	
GENERAL HEALTH			
A9	In general how would you rate your health?	**1.**Excellent [ ] **2.**Very good [ ] **3.**Good [ ] **4.**Poor [ ] **5.**Very poor [ ] **6.**Bad [ ]	
A10	In general how would you rate your eyes or vision?	**1.**Excellent [ ] **2.**Very good [ ] **3.**Good [ ] **4.**Poor [ ] **5.**Very poor [ ] **6.**Bad [ ]	
A11	Are you on treatment for any of these?	1.Asthma 2.Sickle Cell disease 3.Diabetes 4.Hypertension 5.Cancer	Yes[ ] No[ ] Yes[ ] No[ ] Yes[ ] No[ ] Yes[ ] No[ ] Yes[ ] No[ ]
A11b	Have you ever been treated for chronic disease conditions?	1.Asthma 2.Sickle Cell disease 3.Diabetes	Yes[ ] No[ ] Yes[ ] No[ ] Yes[ ] No[ ]

		4.Hypertension 5.Cancer	Yes[ ] No[ ] Yes[ ] No[ ]
A12	Is there any family member with/ history any of the disease mentioned above?	1.Yes [ ] 2.No[ ]	
A13	Did you go for your medical screening as part of your admission in University of Ghana?	1.Yes [ ] 2. No[ ]	
A14	Did you check your eyes during the medical screening? **If No** kindly specify reason	1.Yes [ ] 2.No[ ] ……	
EYE HEALTH KNOWLEDGE			
B2	Have you ever heard of the eye condition glaucoma?	1.Yes [ ] 2.No[ ]	**If 'No' go to B9**
B3	Have you ever been told that you have glaucoma?	1.Yes [ ] 2.No[ ]	
B4	How would you describe Glaucoma?	**Tick all appropriate** 1.High pressure of the eye [ ] 2.An eye disease which limits the visual field [ ] 3.An eye disease which damages the optic nerve[ ] 4.Increasing the internal liquid of eye[ ] 5.Problem at the back of the eye[ ] 6.Tunnel vision Blindness[ ] 7.Eye disease[ ] 8.Inflammation/infection[ ] 9.Do not know[ ]	
B5	What is the worst effect of glaucoma?	1.Blindness[ ] 2.Low Vision [ ] 3.Cosmetic problems[ ] 4.Pain[ ] 5.Other……..……	
B6	What is the first presentation of glaucoma in most cases?	1.It may start without any alarming symptoms or signs[ ] 2.Visual loss[ ] 3.Pain[ ] 4.No Sign[ ] 5.Other……	
B7	What is the treatment for glaucoma?	1.Surgery [ ] 2.Drugs [ ] 3.Laser treatment [ ] 4.No need for treatment [ ] 5.Visiting optometrist[ ] 6.Visiting ophthalmologist [ ] 7.Do not know [ ]	
B8	Does any family member have glaucoma?	1.Yes[ ] 2.No[ ] 3.Don't know [ ]	
B9	Have you ever heard of the eye condition Refractive error?	1.Yes [ ] 2.No[ ]	
B10	Have you ever been told that you have refractive error?	1.Yes [ ] 2. No[ ]	

B11	What is myopia?	1.Focus before retina[ ] 2.Cannot see distant object[ ] 3.Wearing glasses[ ] 4.Do not know[ ]	
B12	How is myopia treated?	1.Wearing spectacles[ ] 2.Don't know [ ] 3.Surgery[ ] 4.Eye drops[ ] 5.Traditional medicine [ ] 6.Antibiotic[ ] 7.Cannot treat[ ]	
B13	What is hyperopia?	1.Focus behind the retina[ ] 2.Cannot see near objects[ ] 3.Do not know[ ]	
B14	How is hyperopia treated?	1.Wearing Spectacle 2.Don't know [ ] 3.Surgery[ ] 4.Eye drops[ ] 5.Traditional medicine [ ] 6.Antibiotic[ ] 7.Cannot treat[ ]	
B15	What is presbyopia?	1.Impaired vision at near due to aging[ ] 2.Poor vision from far[ ] 3.Do not know[ ]	
B16	How is presbyopia treated?	1.Wearing Spectacle 2.Don't know [ ] 3.Surgery[ ] 4.Eye drops[ ] 5.Traditional medicine [ ] 6.Steam from boiling rice[ ] 7.Antibiotic[ ] 8.Cannot treat[ ]	
B17	Do you use any eye wear glasses, contact lenses, reading glasses.	1.Yes [ ] 2.No[ ]	**If "No" please go to B 23.**
B18	Where did you get your spectacles,	1. Road side [ ] 2. Self-Buy [ ] 3. Eye clinic [ ] 4. Outreach [ ] 5. A Friend[ ] 6. A gift[ ]	
B21	Who prescribed your spectacles to you?	1.Ophthalmologist [ ] 2.Optometrist[ ] 3.Optician[ ] 4.Ophthalmic nurse [ ] 5.Tent [ ] 6.Self-Buy [ ] 7.Don't know[ ]	
B22	What is the purpose of your spectacle?	1. Computer use[ ] 2. Near vision[ ] 3. Distance vision[ ] 4. Both near and distance vision[ ] 5. Don't know[ ] 6. Fashion[ ]	

B23	Does any family member have refractive error (myopia, hyperopia, astigmatism or presbyopia)?	1. Yes[ ] 2. No[ ] 3. Don't know [ ]	
B24	Have you ever heard of the eye condition cataract?	1.Yes [ ] 2.No[ ]	**If 'No' go to B 31**
B25	Have you ever been told that you have Cataract?	1.Yes [ ] 2.No[ ]	
B26	How would you describe it?	1. It is white spot in the eye[ ] 2. It is a white pupil[ ] 3. The opacification of the lens [ ] 4. Any changes in eye lens which make it unclear or white[ ] 5. Visual loss due to a covering shield in front of light rays[ ]	
B27	What is the worst effect of cataract?	1. Blindness [ ] 2. Low Vision [ ] 3. Pain [ ] 4. Cosmetic Problems [ ] 5. Other……	
B28	Is cataract a treatable condition?	1. Yes[ ] 2. No[ ] 3. Don't know [ ]	
B29	What is the treatment for cataract?	1. Don't know [ ] 2. Surgery[ ] 3. Eye drops[ ] 4. Traditional medicine [ ] 5. Steam from boiling rice[ ] 6. Antibiotic[ ] 7. Cannot treat[ ]	
B30	Does any family member have cataract?	Yes[ ] 2. No[ ] 3. Don't know [ ]	
B31	Which of these eye tests have you done before during your eye test?	1. Visual acuity test (Read letters from a chart) [ ] 2. Intraocular (Eye) pressure check[ ] 3. Fundus examination (Looked inside the eyes) [ ]	
INFORMATION SOURCE			
B32	How did you hear about the eye conditions mentioned above?	1. Health Care personnel office [ ] 2. Workplace [ ] 3. Religious or social organization[ ] 4. TV/ Radio Commercial [ ] 6. Social media [ ] 7. Newspaper/ Magazine/newsletter [ ] 8. Family/Friend [ ] 9. Educational pamphlet Online [ ] 10. Drug store or supermarket [ ] 11. Never heard anything about it[ ] 12. Others please specify[ ]……..	
EYE HEALTH ATTITUDE			
C1	If it were possible to prevent only one of the following diseases, which of these diseases would you prevent first?	**Condition** 1. Cancer of the bowel or gut 2. Schizophrenia (a mental disorder) 3. Heart disease 4. Total blindness	**Tick one** **[ ]** **[ ]** **[ ]** **[ ]**

		5. Alzheimer's disease(memory) 6. Can't say	**[ ]** **[ ]**
C2	If it were possible to provide treatment and support for one of the following disabilities, which of these disabilities would you provide treatment and support for **first**?	**Condition** 1. Paralysis on one side of the body as a result of a Stroke. 2. Loss of speech as a result of a stroke. 3. Total deafness 4. Total blindness 5. Amputation of an arm 6. Can't say	**Rank 1st-6th** **[ ]** **[ ]** **[ ]** **[ ]** **[ ]** **[ ]**
C3	Regular eye checkup is necessary even when there is no eye problem.	Disagree[ ] Neutral [ ] Agree[ ]	
C4	Personal beliefs can prevent people from assessing eye care.	Disagree[ ] Neutral [ ] Agree[ ]	
C5	Cost of eye care can prevent people from assessing eye care.	Disagree[ ] Neutral [ ] Agree[ ]	
C6	The fear of giving glasses can prevent one from going to the eye clinic.	Disagree[ ] Neutral [ ] Agree[ ]	
C7	Cataract surgery restores sight.	Disagree[ ] Neutral [ ] Agree[ ]	
C8	People from cities utilize eye care services facility than those from the rural area.	Disagree[ ] Neutral [ ] Agree[ ]	
C9	Even when vision is very clear from far and near, you can have glaucoma.	Disagree[ ] Neutral [ ] Agree[ ]	
C10	I know my eyes are good, so I don't need an eye checkup.	Disagree[ ] Neutral [ ] Agree[ ]	
C11	Children can use spectacles	Disagree[ ] Neutral [ ] Agree[ ]	
C12	Herbal preparations can be used to treat eye problems.	Disagree[ ] Neutral [ ] Agree[ ]	
EYE HEALTH PRACTICE			
D1	The last time you had an eye problem what did you do?	1. Nothing [ ] 2. Visited a hospital [ ] 3. Visited an eye clinic [ ] 4. Visited a traditional healer [ ] 5. Visited a pharmacy [ ] 6. Self-medicated [ ] 7. Herbal drugs [ ] 8. Other (specify) ……..	
D2	a. How many times have you checked your eyes in an eye care facility? b. What's the name of the eye care facility? Most Recent	0. Never [ ] 1. Once [ ] 2. 1-3 times [ ] 3. More than 3 times [ ] Please Specify…… ……	
D3	What qualities would you want	1. If the staff are friendly [ ]	

	of an eye clinic that would attract your patronage? Please tick only one	2. If the clinic is affordable[ ] 3. If the clinic is not far [ ] 4. If clinic is open till late [ ] 5. Expertise 6. Other (specify) …….....	
D4	When was the last time you visited an eye care practitioner?	1.Never [ ] 2.1-6months ago [ ] 3.7-12 months ago [ ] 4.1- 2 years ago [ ] 5.More than 2 years ago[ ] 6.Do not remember [ ]	**If "never" or "do not remember" SKIP D5 to D9**
D5	Which eye care provider did you see?	1. Ophthalmologist [ ] 2. Optometrist [ ] 3. Ophthalmic nurse [ ] 4. Optician [ ] 5. General Practitioner [ ] 6. Tent sellers[ ] 7. Don't know[ ]	
D6	What was the reason for the visit?	1. Routine [ ] 2. Curative [ ] 3. Review [ ] 4. Other [ ]…….	
D7	What type of clinic did you visit?	1. Public [ ] 2. Private [ ] 3. Other (specify) ……	
D8	Why did you choose to visit that type of practitioner?	1. Friendly staff [ ] 2. Cost of the visit [ ] 3. Proximity [ ] 4. Didn't choose[ ] 5. Was mandatory[ ]	
D9	Why did you choose to visit that clinic?	1. Less waiting time [ ] 2. Less cost [ ] 3. More privacy [ ] 4. Better care [ ] 5. Proximity [ ] 6. Friendly staff [ ] 7. Was mandatory[ ] 8. Others Specify…….	

Dear Participant, Thanks for your time.