

**THE AVAILABILITY AND ACCESSIBILITY OF LOW VISION SERVICES IN
ASHANTI AND BRONG AHAFO REGIONS OF GHANA**

BY

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Preface

The burden of moderate and severe visual impairment has become a global concern and efforts to curb it is a priority on the agenda of national and international bodies.

Knowledge about availability and accessibility to low vision care is important and a study to investigate these is a step in the right direction.

The current study which aims at assessing the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana was conducted both for the attainment of a Master of Optometry degree and to provide evidence-based information to all stake holders in eye care, particularly for those in the field of low vision.

Appreciation is extended to all who helped this study in the acknowledgement section.

Declaration

I, Dr Sylvester Kyeremeh, declare that this thesis is a result of my own investigation and research. It has not been previously submitted to the University of KwaZulu-Natal or any other university for a degree and is not being currently considered for any other degree at any university and that it contains my own work. Where use has been made of the work of others, it is duly acknowledged in the text.

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Dedication

This thesis is dedicated to my wife and children.

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Acronyms

ARMD	Age Related Macular Degeneration
CES-D	Centre for Epidemiological Studies Depression Scale
CHPS	Community-Based Health Planning Services
GDP	Gross Domestic Product
GDS	Geriatric Depression Scale
GEF	Ghana Eye Foundation
GHS	Ghana Health Service
GOA	Ghana Optometric Association
GSS	Ghana Statistical Service
ICD	International Classification of Diseases
KATH	Komfo Anokye Teaching Hospital
LVD	Low Vision Devices
MSVI	Moderate and Severe Visual Impairment
NHIS	National Health Insurance Scheme
OPD	Out-Patient Department
SPSS	Statistical Package for Social Scientists
WHO	World Health Organisation

Abstract

Background: The prevalence of low vision on the African continent is generally high and varies across and within countries, as well as in people of different socioeconomic status. While regional studies on the prevalence of blindness and low vision in Ghana have been conducted, there is a lack of information on the availability and accessibility of low vision services in these regions. The aim of the study was to assess the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana.

Methods: This was a descriptive, quantitative, cross-sectional study design. Hand-delivered semi-structured questionnaires were used to collect information from eye care professionals selected from 58 eye care facilities within the Ashanti and Brong Ahafo regions of Ghana. In addition, face-to-face interviews were conducted with 29 low vision patients from the same regions.

Results: Forty-four eye care facilities from the Ashanti region and 10 from the Brong Ahafo region responded to the questionnaire, giving an overall response rate of 93%. A total of 29 patients including 16 males and 13 females with a mean age of 33.79 ± 17.42 years were interviewed from four different eye care facilities. Out of 50 eye care facilities who reported that they had low vision patients attending their clinics, 33 (66%) did not provide low vision services and 17 (34%) offered some form of this service. Eleven out of 15 (73.3%) patients reported that it was either difficult or very difficult to acquire optical low vision devices while 10 (83.3%) out of 12 patients reported the same about non-optical low vision devices. Of the 15 patients who responded to the questions on where they obtained their optical devices, 7 (47%) reported that they were donated to them, 2 (13%) obtained them from the market while 6 (40%) reported getting their devices from the hospitals or eye care facilities. For non-optical devices, the patients reported obtaining them from the market 5 (31%) and through donations 5 (31%). Others obtained them from the society for the blind 2 (15%), hospitals or eye clinics 2 (15%) and a resource centre 1 (8%). Barriers to the provision and uptake of low vision services included the lack of testing equipment, lack of assistive devices and high cost of services.

Conclusions: Availability and accessibility of low vision services are limited in the Ashanti and Brong Ahafo regions. These findings should help to inform interventions to make low vision services available and accessible as well as to overcome the barriers to providing and utilising these services to minimise the impact of visual impairment.

Key words: Low vision services, availability, accessibility, Ashanti, Brong Ahafo

CHAPTER 1: INTRODUCTION

1.1 Introduction

This study sets out to investigate the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana. This chapter presents the background to the study and outlines the rationale for the study, aim and objectives, research questions, significance and overall thesis structure.

1.2 Background

Globally, there are approximately 285 million people with visual impairment or blindness according to the World Health Organisation (WHO) (WHO, 2012). Of this number, 246 million have low vision and 39 million are blind. The majority (90%) of the visually impaired live in low-income countries and 82% are 50 years and older (WHO, 2012). In Africa, the prevalence of avoidable blindness based on the population in each of World Health Organisation's (WHO) regions is 16.6% coming third after the Western Pacific (26%) and South East Asia (28%). The prevalence of low vision on the African continent shows great variations across and within countries, and among people of different socioeconomic status (Oduntan, 2005). In Ghana, there is a paucity of published data on the national prevalence of low vision however, studies conducted at regional levels (the country is divided into 10 regions) have found high prevalence of patients with low vision. For instance, Kumah et al., (2016) found the prevalence of low vision to be 9.8% in Tema, an industrial city in the Greater Accra region. The study found the major causes to be cataract (50.85%), uncorrected refractive errors (18.64%) and glaucoma (11.87%) (Kumah et al., (2016). In the Brong Ahafo region, the prevalence of low vision among adults 30 years or older is reported to be 2% while that of bilateral blindness (best acuity <3/60) is 1.7% (Moll et al., 1994). The causes of blindness were determined as cataract (62.5%), onchocerciasis (12.5%), corneal opacity (non-trachomatous) (8.2%), refraction anomalies (4.2%), phthisis bulbi (4.2%), optic atrophy (4.2%), and vascular retinopathy (4.2%) (Moll et al., 1994). Guzek et al., (2005) found a 4.4% and 2.8% prevalence of moderate and severe bilateral blindness respectively in the Volta region of Ghana. The main causes of blindness were cataract and glaucoma (53.9% and 20.6%, respectively) (Guzek et al., 2005). The high prevalence of low vision correlates positively with

social variables such as unemployment, motor vehicle collision and depression among others (WHO, 2004; Biza et al., 2013; Evans et al., 2007; Hassell et al., 2006).

Low vision services in Ghana are provided in the Eastern Regional hospital located at Koforidua, Komfo Anokye Teaching hospital (KATH) in Kumasi in the Ashanti region, Korle Bu Teaching Hospital and the Ghana Blind Union in Accra in the Greater Accra region. Several schools for the blind have been established in some regions of the country to cater to the needs of children with visual disabilities. The Akropong School for the blind in the Eastern region, Wa School for the Blind in the Upper East region, A.D.C. Middle School at Agona Bobikuma and Swedru Secondary School in the Central region and the Wenchi Secondary School in the Brong Ahafo region are established institutions for training students with visual impairment. These facilities are few and unevenly distributed, and access to many, particularly for those in rural and remote areas is limited.

1.3 Rationale for the study

Low vision is a public health challenge in Ghana and few studies have investigated this area of eye care. While regional studies on the prevalence of blindness and low vision in Ghana have been conducted, there is a lack of information on the availability and accessibility of low vision services in these regions. As a result, there is no comprehensive and co-ordinated plan to address this eye health challenge. The current study seeks to fill the knowledge gap on the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana and to provide the basis for planning low vision care in these areas.

1.4 Aim and objectives

The aim of the study was to assess the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana.

The specific objectives were to:

- a. Determine the level of availability of low vision services in the Ashanti and Brong Ahafo regions of Ghana.
- b. Determine the level of accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana.

- c. Determine the pattern of utilisation of low vision devices in the Ashanti and Brong Ahafo regions of Ghana.
- d. Determine referral centres for low vision patients and challenges faced by eye care practitioners in providing low vision services in the Ashanti and Brong Ahafo regions of Ghana.

1.5 Research questions

- a. What is the level of availability of low vision services in the Ashanti and Brong Ahafo regions of Ghana?
- b. What is the level of accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana?
- c. What are the patterns of utilisation of low vision services in the Ashanti and Brong Ahafo regions of Ghana?
- d. What are the referral centres for low vision patients and challenges faced by eye care professionals in providing low vision services in the Ashanti and Brong Ahafo regions of Ghana?

1.6 Significance of the study

The results of this study will help policy makers in planning low vision services in these areas and will also serve as a basis for further research. It will also help eye care professionals identify facilities to where patients could be referred when it becomes necessary.

1.7 Thesis structure

This study is presented in the following chapters:

Chapter 1. This chapter provides the background and introduction to the study as well as the rationale, aim, objectives and significance of the study. It also provides insight into the structure of the thesis in its entirety and describes the flow of the content.

Chapter 2. Literature review: This chapter provides a literature review of current trends regarding low vision.

Chapter 3. Methodology: This chapter provides details of the methods used to conduct the study.

Chapter 4. Results: Major study findings are provided in this chapter.

Chapter 5. Discussion: This chapter discusses the results of the study, and compare the study findings with other available literature.

Chapter 6. Conclusion: This chapter provides the limitations and the conclusions of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In order to understand previous research on low vision, Chapter 2 presents an overview of the literature reviewed. It highlights the prevalence, causes and impact of low vision, and details literature on the availability, accessibility, benefits and barriers to low vision care.

2.2 Overview and definitions

Based on the 2008 version of the International Classification of Diseases 10th Revision (ICD-10), visual impairment is defined as visual acuity of 6/18 or worse with the best possible correction (WHO, 2008). Low vision is defined as visual acuity of 6/18 up to or better than 3/60 with the best possible correction while blindness is defined as visual acuity worse than 3/60 (WHO, 2008). Table 2.2.1 below illustrates the 2008 categorisation of visual impairment according to the ICD-10.

Table 2.2.1: The 2008 version of ICD-10 categorisation of visual impairment

Category of visual impairment	Visual acuity with best possible correction	
	Maximum less than:	Minimum equal to or better than:
1	6/18	6/60
2	6/60	3/60
3	3/60	1/60 (CF at 1m) *
4	1/60	Light perception
5	No light perception	
9	Undetermined/unspecified	

**CF = counting fingers *Categories 1 and 2= low vision *categories 3,4 and 5= blindness*

**category 9= unqualified visual loss*

If the extent of the visual field is taken into account, patients with a field no greater than 10° but greater than 5° around central fixation should be placed in category 3 and patients with a field no

greater than 5° around central fixation should be placed in category 4, even if the central acuity is not impaired (WHO, 2008).

However, in the revised version of the ICD-10, visual impairment is defined as **presenting distance visual acuity** of 6/18 or worse (WHO, 2010). Based on this definition, visual impairment has been categorised and the term low vision refers to moderate and severe visual impairment (Table 2.2.2).

Table 2.2.2: The 2010 revised version of ICD-10 categorisation of visual impairment

Category	Presenting distance visual acuity	
	Worse than:	Equal to or better than:
Mild or no visual impairment (0)		6/18
Moderate visual impairment (1)	6/18	6/60
Severe visual impairment (2)	6/60	3/60
Blindness (3)	3/60	1/60 (CF at 1m)*
Blindness (4)	1/60	Light perception
Blindness (5)	No light perception	
(9)	Undetermined	or
	unspecified	

*CF = counting fingers

If the extent of the visual field is taken into account, patients with a visual field of the better eye no greater than 10° in radius around central fixation should be placed under category 3 (WHO, 2013). For monocular blindness, this degree of field loss would apply to the affected eye (WHO, 2013).

Due to the negative impact of visual impairment and blindness on the individual and society at large, a global initiative known as VISION 2020: The Right to Sight, was launched in 1999 by the WHO in collaboration with the International Agency for the Prevention of Blindness (IAPB). The goal of this initiative is to eliminate the main causes of all preventable and treatable blindness by the year 2020 (WHO, 2013). Therefore, for the purposes of clarification and better outcome during assessment and treatment of visually impaired people, the WHO has classified visual function into four categories as follows: normal vision, moderate visual impairment, severe visual impairment

and blindness (WHO, 2013). Normal vision corresponds to category 0 while blindness corresponds to categories 3, 4 and 5 as presented in Table 2.2.2. Category 9 is undetermined or unspecified.

2.3 Global prevalence and causes of low vision

The WHO has estimated that 285 million people are visually impaired worldwide, majority of whom live in developing countries (WHO, 2012). Out of this, 246 million have low vision (WHO, 2012). Visual impairment is also more common among rural dwellers compared to people in urban communities (Berhane et al., 2007). This is primarily due to poverty experienced by rural dwellers (Kuper and Foster, 2005). Poverty and blindness are thought to be cyclically linked, with poverty increasing the risk of becoming blind and blindness exacerbating poverty through limiting opportunities to engage in income generating activities (Kuper and Foster, 2005). There is also an uneven distribution of eye care service providers with more being concentrated in urban areas while rural areas are underserved (Culham et al., 2002). This results in poor access to basic eye services in underdeveloped countries or rural communities. In addition, there are country and regional variations in the prevalence and causes of visual impairment.

2.3.1 Asia

The prevalence of low vision and blindness in Tehran, Iran was reported to be 1.11% and 0.39% respectively, the major causes being cataract (36%), macular degeneration (20%) and amblyopia (10.7%) (Fatouhi et al., 2004). Mansour and Kassak, (1997) in Lebanon found a much higher prevalence of low vision and blindness; 3.9% and 0.6% respectively. Similar to the study in Iran, cataract was the leading cause of visual impairment in Lebanon (Mansour and Kassak, 1997). While macular degeneration was second to cataract in the study in Iran, uncorrected high refractive errors were the second leading causes of visual impairment in the Lebanese study. However, in Nepal, retinitis pigmentosa (18%) and age-related macular degeneration (ARMD) (14%) were the most common causes of low vision (Khanal and Lama, 2013).

2.3.2 Europe

Age-related macular degeneration (ARMD) and other retinal diseases have been reported to be the highest causes of visual impairment in European countries (Leat and Rumney, 1990). For example, in England and Wales, the main causes of low vision were reported to be ARMD (56%), glaucoma (10.2%), diabetic retinopathy (7.4%), hereditary retinal disorders (2%), and optic atrophy (1.9%) (Leat and Rumney, 1990). In Iceland, a study among the citizens of Reykjavik showed that ARMD was the major cause of bilateral visual loss, whereas the most common causes of unilateral visual loss were amblyopia, cataract and glaucoma (Gunnlaugsdottir and Arnarsson, 2008). The prevalence of bilateral visual impairment and blindness were 0.96% (95% confidence interval [CI] 0.37:1.55) and 0.57% (95% CI 0.12:1.03), respectively, using the WHO criteria, and 2.01% (95% CI 1.16:2.86) and 0.77% (95% CI 0.24:1.29), respectively, using the US criteria (Gunnlaugsdottir and Arnarsson, 2008). Cedrone et al. (2006) found that cataract, glaucoma, degenerative myopia, and ARMD were the main causes of visual loss in the better eye in Italy.

2.3.3 Australasia/Oceania

In Australia, cataract, uncorrected refractive errors and ARMD were the major causes of visual impairment and blindness with prevalence rates relatively higher compared to the studies from Europe. Ramke et al. (2007) conducted a population-based cross-sectional survey using multi-stage cluster random sampling in Timor-Leste, and found that the adjusted prevalence for low vision (better eye presenting vision of 3/60 or better but worse than 6/18) was 17.7% (95% CI 15.7:19.7). Cataract was the most common cause of blindness (72.9%) and an important cause of low vision (17.8%). Uncorrected refractive error caused 81.3% of low vision (Ramke et al., 2007). Keeffe et al. (2014) also found cataract and uncorrected refractive error to be major contributors to the prevalence of moderate and severe visual impairment (MSVI) and blindness. They also found that in Oceania, the age-standardised prevalence of blindness and MSVI did not decrease significantly (1.3% to 0.8% and 6.6% to 5.1%) respectively, but in Southeast Asia, blindness decreased significantly from 1.4% to 0.8%. These prevalence rates are also comparable to other findings in Asia. With the increasing number of the older population, there have been relatively small increases in the number of blind (2%), and with MSVI (14%) in Southeast Asia, whereas increases have been greater in Oceania with 14% for blindness and 31% for MSVI.

2.3.4 Americas

The prevalence of low vision and blindness reported in Canada were 35.6 and 3.8 per 10,000 individuals (Maberley et al., 2006). The most common causes of vision loss among individuals were cataract, visual pathway diseases, ARMD and other retinal diseases (Maberley et al., 2006). Diabetic retinopathy and glaucoma were less frequently encountered (Maberley et al., 2006). In Latin America, a review of recent data has shown that the prevalence of blindness and low vision increased with poor economic levels with cataract and refractive errors being the most common causes (Limburg et al., 2008). The prevalence of low vision reported in Buenos Aires, Argentina was 5.9% with an increase to 12.5% in rural Guatemala (Limburg et al., 2008). In these areas, cataracts were reported to be the main cause of blindness (41-87%) followed by posterior segment diseases (7-47%). The prevalence of avoidable blindness ranged from 43% in urban Brazil to 94% in rural Guatemala (Limburg et al., 2008). In the urban areas with adequate eye care services, blindness and low vision due to posterior segment diseases were reported to be increasing (Limburg et al., 2008).

2.3.5 Africa

Research conducted in Ethiopia showed a national prevalence of low vision in approximately 3.7% of people (with considerable regional variations) and that of blindness in 1.6% of people (Berhane et al., 2007). The major causes of low vision were cataracts (42.3%), uncorrected refractive error (33.4%), and trachomatous corneal opacity (7.7%) (Berhane et al., 2007). The researchers also found that visual impairment was higher among the aged, female gender and those in rural settings (Berhane et al., 2007). The authors suggested that the gender and residency differentials reflect on the social inequalities related to accessing health and health related services that leave females and rural residents at a disadvantage. However, age was considered a biological risk factor (Berhane et al., 2007).

In Cameroon, Oye and Kuper (2007) found the prevalence of bilateral blindness to be 1.1% (95% CI: 0.7:1.5%), 0.3% (0.1:0.6%) for severe visual impairment and 3.0% (2.0:4.0%) for visual impairment. These were followed by refractive error which accounted for 22% of visual impairment (Oye and Kuper, 2007). The etiology of low vision (including visual impairment and severe visual impairment) was mainly cataract causing 43% of severe visual impairment and 48%

visual impairment (Oye and Kuper, 2007). However, Oye and Kuper, (2007) noted that the prevalence of blindness and severe visual impairment was similar in men and women. Although no explanations were given by the authors, women were still found to be significantly more likely to be visually impaired than their male counterparts ($p < 0.01$) (Oye and Kuper, 2007).

Entekume et al. (2011) reported a crude prevalence (without adjusting for any factors) of functional low vision (defined as best corrected vision less than 6/18 in the better eye, after excluding those with no light perception in both eyes and those with treatable causes) of 3.5% (95% CI, 3.1:3.9%) in Nigeria. The authors found that glaucoma was the most common cause of functional low vision in both rural and urban areas accounting for a little over one-quarter of all cases (26.5%). This was followed by corneal opacities (21.5%), age related macular degeneration (11%) with complications of surgery, mainly cataract surgery and couching being responsible for 4.8%. While Berhane et al. (2007) found visual impairment to be higher among the female gender due to social inequalities related to accessing health care, Entekume et al. (2011) found that males had higher odds of functional low vision than females. However, this was not statistically significant and no particular reasons were given for such observation.

2.4 Impact of low vision

Vision loss reduces the individual's ability to undertake vision dependent tasks associated with activities of daily living. Activities of daily living include self-care, social activities, mobility tasks, leisure pursuits and work (Lamoureux et al., 2004; Binns et al., 2012). Low vision patients have poor functional status with regard to carrying out such activities. These activities contribute to the quality of life, and any limitation could result in deterioration in the quality of life, increased dependence on family and or social support, nursing, home placement, low self-rating of health and increased depressive symptoms (Hassell et al., 2006; Evans et al., 2007). The WHO has indicated that visually impaired people are three times more likely to suffer anxiety and depressive symptoms. In the study of Evans et al. (2007), out of the 13,900 people older than 75 years who were investigated in the UK, 13.5% of those with visual impairment (using binocular acuity less than 6/18) were found to have significant depressive symptoms compared to 4.6% with good vision. Visual impairment imposes substantial costs on society, particularly to the affected individuals and their families. In 2007, Roberts et al. found that visual impairment in Japan which

had affected 1.64 million people cost yen8784 billion (US\$ 72.8 billion) across economy, equivalent to 1.7% of Japan's gross domestic product (GDP) (Roberts et al., 2010). In the United States, Frick et al. (2007) showed that blindness and visual impairment were significantly associated with higher medical care expenditures with homecare expenditure most affected by the former.

Severe visual impairment has also been found to be associated with short life span (Lee et al., 2002). The prevalence of visual impairment among children has been reported to be associated with a high rate of under-5 mortality (Gilbert and Ellwein, 2008). In poor countries, 60-80% of blind children have been reported to die within 1 to 2 years of becoming blind (Lewallen and Courtright, 2001). Lee et al. (2002) reported that people with severe visual impairment have also been reported to be associated with poor health. The authors showed that while only 3% of people with no visual impairment had poor health, 13% and 25% of those with visual impairment and severe visual impairment respectively, had poor health. Finally, restricted mobility and orientation skills in individuals with visual impairment makes them vulnerable to falls, increasing their chances of hip fractures (Lord, 2001; Ivers et al., 2003). According to the WHO, visually impaired people are two times more likely to suffer a fall while walking. It is therefore evident that low vision has a significant impact on the individual patient, their family and society at large.

2.5 Low vision services

A low vision service is a rehabilitative or habilitative process which provides a range of services for people with low vision to enable them to make best use of their eyesight and visual function (Carol et al., 2007). The aim of assessing a low vision patient is to understand how the low vision has impacted the person's daily activities, so that appropriate management services may be provided (Keeffe, 2004). The services delivered should be based on the needs identified by patients and or care-givers and must be flexible enough to meet the needs of its patient group, including those with additional disabilities such as learning disabilities (Carol et al., 2007). The low vision assessment is usually conducted by an ophthalmologist or optometrist, but could also be done by an appropriately trained orthoptist (vision therapist or ophthalmic technician), ophthalmic medical officer or other health worker. Carol et al (2007) recommend that a standard low vision service should include review of needs (history, symptoms, current situation and assessment of needs or

goal setting), comprehensive examination, prescription of optical and non-optical assistive devices, training of use of these devices and possible referrals. Optical devices magnify objects by means of a lens or combination of lenses for example magnifiers and telescopes while non-optical devices are items designed to promote independent living by altering environmental perception through enhancing illumination, contrast and spatial relationship (Minto and Butt, 2004). It is important that low vision services reflect a multi-disciplinary, multi-agency approach that coordinates with other health, social care and voluntary providers in the area, including services provided at the patient's residence, school or other appropriate location (Carol et al., 2007).

Irrespective of the fact that some of the more rehabilitative services are complex, at times a simple refraction or prescription of a magnifier may be all that a low vision patient may need (Silver et al., 1995). Barbie (2004) has shown that refractive corrections are the most commonly prescribed optical devices followed by magnifiers and telescopes. Low vision patients may be attended to and provided with the appropriate management regimen at all levels of eye care: primary, secondary and tertiary levels depending on their individual needs. Notwithstanding, there should be a clear, well-defined referral mechanism between the different levels of the health system, no matter where patients first report (Simon, 2008).

2.6 Benefits of low vision services

It has been reported that low vision rehabilitation services can help enhance functional vision, potentially benefiting 90% of patients (Hinds et al., 2003). Barbie (2004) reported that when low vision services are made available to patients, they can enjoy the same quality of life as those with normal eyesight. The use of low-vision services has been shown to contribute to a decline in depressive symptoms (Horowitz et al., 2005; Rees et al., 2009). While Horowitz et al., (2005) found a marked improvement in depressive symptoms using the Centre for Epidemiological Studies Depression Scale (CES-D), Robbins and McMurray (1988) found a statistically insignificant small to moderate reduction in depression using the Geriatric Depression Scale (GDS-30). These are positive indicators that psychological effects may reduce once low vision patients have been rehabilitated.

In Africa, a significant proportion of students in schools for the blind are severely visually impaired, but not blind (Silver et al., 1995). Out of 230 students who were examined in schools

for the blind in Uganda and Kenya, Silver et al., (1995) found that 140 (61%) were classified as having low vision, according to the WHO's new definition. Forty-two (30%) out of the 140 students were blind according to WHO categories of visual loss (Silver et al., 1995). The authors suggested that if these students were provided with appropriate low vision aids, this "wrong categorisation" of low vision patients could be reduced.

2.7 Availability and accessibility of low vision services worldwide

Due to the high prevalence of visual impairment globally, the need for low vision aids and their patronage are essential. Apart from availability and accessibility, uptake of health services is determined by many other factors. For instance, Levesque et al., (2013) used approachability, acceptability, availability and accommodation, affordability and appropriateness of health services to determine how patients access health care. The current global coverage and availability of low vision care in most countries is reported to be less than 10% (Chiang et al., 2011). This finding is similar to those reported in developed countries which has indicated that the service uptake rate varies across the world ranging from 3-15% (Gresset and Baumgarten, 1994; Lovie-Kitchin, 1990).

In Australia, Pollard et al. (2003) found that less than one in five patients with low vision accessed services. Similarly, it has been reported that over 1.0 million people in the United Kingdom may benefit from low vision support, but the system offers no more than 155000 (15.5%) appointments per annum (Culham et al., 2002). The authors also found that out of the 1945 eye care providers, 41% (803) offered no low services, 26% (497) only sold magnifying devices and 33% (n = 638) provided low vision services with hospital eye departments being the largest provider of services (65% of the total annual appointments).

Issues of availability and accessibility are more serious in developing countries (Barbie, 2004; Silver et al., 1995). For example, 703 children in schools for the blind in India were examined and 124 were identified as having low vision (Pal et al., 2006). The researchers found that none of the children had low vision devices although 28 were wearing glasses at the time of the study. A study conducted in schools for the blind in Uganda and Kenya also confirmed that there were limited low vision services in developing countries (Silver et al., 1995). The researchers identified that there were indications of improved visual functions after examining 230 students (51 schools and

16 university students in Uganda and 163 students in Kenya), but low vision services and low vision devices were not available in any of the schools (Silver et al., 1995). All these reports suggest that low vision services are limited particularly in underdeveloped and developing world and require attention.

2.8 Barriers to low vision services

The inadequacy of low vision care has been attributed to various factors such as lack of health professionals particularly in the rural areas. It has been found that in Ghana, over 85% of optometrists (Ghana Eye Foundation, 2005) and 65% of ophthalmologists (Potter et al., 2013) practice in urban centres (mainly the Greater Accra and Ashanti regions) and therefore their services are not available to many rural dwellers. Culham et al. (2002) also reported results that are similar to those of Potter et al. (2013). Ntim-amponsah and Amoaku, (2005) raised concerns about the escalating utilisation of alternate eye health services (these include eye care information and services that are sought outside the regular eye care system at hospitals and clinics) within the community of Akwapim South district in the Eastern region of Ghana. The participants' responses revealed that long waiting time in hospitals, fear and uneasiness of going to a hospital in town, and unfamiliar hospital staff, perceived successes and proximity of alternative service providers made them easily inaccessible to the community (Ntim-amponsah and Amoaku, 2005).

In a study conducted at the Eastern regional hospital's low vision department, Oveneri-Ogbomo et al., (2013) found that the most common reason for low uptake of low vision devices was cost. Other reported reasons were non-availability of the devices, fear of stigma, lack of active improvement in vision and inability to contact patients (Oveneri-Ogbomo et al., 2013). Lack of training, awareness and motivation on the part of ophthalmologists were identified to be other barriers to providing low vision care particularly in India (Safaraz and Shamanna, 2005). This leads to lack of appropriate referrals by ophthalmologists and therefore compromising those patients who could otherwise benefit from low vision aids. Other researchers have also found that concurrent major health problems and patients not feeling the need for low-vision rehabilitation were also common reasons for not accessing low vision services (Matti et al., 2011).

2.9 Conclusion

Having reviewed the literature on various aspects of low vision relevant to this study, it is apparent that very little research has been conducted in Ghana to understand availability and accessibility of low vision services while trends from other countries vary.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter details the research design used, study population, sample and sampling procedure, data gathering instruments, procedure for data collection, data analysis and ethical considerations.

3.2 Research design

This was a descriptive quantitative, cross-sectional study design.

3.3 Study area

3.3.1 Ashanti region

The Ashanti region is the most populous among the ten regions of Ghana with a total population of approximately 4,780,380 (19.4% the nation's population) and occupies a land area of 24,389 square kilometres (10.2% of the total land area of Ghana) (GSS, 2012). It is the third largest region by land size after Northern (70,384 square kilometres) and Brong Ahafo (39,557 square kilometres) regions (GSS, 2012). The region is divided into 30 administrative districts including the Kumasi Metropolis and 7 municipalities. The populations of the various districts according the 2010 census are presented in Table 3.1. The Asante Akim Central Municipal, Asokore Mampong Municipal and Kumawu Districts are recent additions to previous 27 districts. Road network to major towns and villages is comparatively good with the regional capital centrally placed and easily accessible by road from almost all parts of the country. Eye care in the region is provided in both private and public clinics and hospitals.

Table 3. 1: Populations by districts in Ashanti Region

District	Population
Adansi North	107,091
Adansi South	115,378
Afigya-Kwabre	136,140
Ahafo Ano North	94,285
Ahafo Ano South	121,659
Amansie Central	90,741
Amansie West	134,331
Asante Akim Central Municipal	71508
Asante Akim North	69,186
Asante Akim South	117,245
Asokore Mampong Municipal	304815*
Atwima Kwanwoma	90,634
Atwima Mponua	119,180
Atwima Nwabiagya	149,025
Bekwai Municipal	118,024
Bosome Freho	60,397
Bosomtwe	93,910
Ejisu-Juaben Municipal	143,762
Ejura Sekyedumase	85,446
Kumasi Metropolitan	1,730,249
Kumawu/Sekyere Afram Plains North	28,535
Kwabre East	115,556
Mampong Municipal	88,051
Obuasi Municipal	168,641
Offinso North	56,881
Offinso South Municipal	76,895
Sekyere Afram Plains	65,402
Sekyere Central	71,232
Sekyere East	62,172
Sekyere South/Afigya Sekyere	94,009

Source: GSS, 2010 Population and Housing Census Final Results

* Previously part of the Kumasi Metropolis

3.3.2 Brong Ahafo region

The Brong Ahafo region constitutes 9.4% (2,310,983) of the national population (GSS, 2012) and occupies 16.6% of the total land area of Ghana (GSS, 2012). It has 27 administrative districts including 7 municipalities. The Asutifi South District, Dormaa West District, Sene East District, Techiman North District and Banda Districts are new additions to the previous 22 districts. The populations of the various districts according to the 2010 census are presented in Table 3.2. The

region has a relatively good road network for access to major towns. Settlements in the region are comparatively widely spaced and eye care is provided by both private and public health facilities.

In both regions, available literature does not provide reliable data on the number of eye care centres nor the particular services that are rendered. However, the Ghana Health Services (GHS) has reported the number of health care facilities in the country with projected target populations for the Ashanti and Brong Ahafo regions to be 5,047,396 and 2,323,875 respectively (GHS, 2010). Table 3.3 shows the number and type of health facilities for the two regions.

Table 3. 2: Populations by districts in Brong Ahafo Region

District	Population
Asunafo North Municipal	124,685
Asunafo South	95,580
Asutifi North	52,999
Asutifi South	52,844
Atebubu-Amantin	105,938
Banda	20,282
Berekum Municipal	129,628
Dormaa East/ Dormaa Central Municipal	50,871
Dormaa Municipal	112,111
Dormaa West	47,678
Jaman North	83,059
Jaman South	92,649
Kintampo Municipal	95,480
Kintampo South	81,000
Nkoranza North	65,895
Nkoranza South	100,929
Pru	129,248
Sene East	60,511
Sene West	58,299
Sunyani Municipal	123,224
Sunyani West	85,272
Tain	88,104
Tano North	79,973
Tano South	78,129
Techiman Municipal	147,788
Techiman North	59,068
Wenchi Municipal	89,739

Source: GSS, 2010 Population and Housing Census Final Results

The Ghana Health Service works with the private sector to provide clinical and public health services in both regions. Some of the clinical services are out-patient department (OPD), in-patient care, surgery, eye care, dental care, obstetrics and gynecology. Expanded Program on Immunisation, Reproductive and Child Health, Disease Control, Nutrition, Health Information Management, Social Mobilisation for Community Support, collaboration with other sectors and the community and the Environmental Health Department are some of the public health services provided by the health facilities in the two regions.

Table 3. 3: Health facilities in the Ashanti and Brong Ahafo regions of Ghana

Facility	Ashanti	Brong Ahafo
Teaching hospitals	1	0
Regional hospitals	0	1
General hospitals	92	26
Polyclinic	0	1
Health centres and clinics	345	186
Maternity homes	106	46
*Chps	4	8
TOTAL	548	268

**Community-based Health Planning and Services Source: GSS 2000 Census*

Study population

The study population included Ophthalmologists, Optometrists, Ophthalmic nurses, Opticians and low vision patients.

Ashanti

The eye health professionals in this region work in private and public health care centres. Ophthalmologists in the region are mostly found in the public hospitals and some few private eye care facilities. Optometrists are mostly in private eye clinics with a few working in public hospitals. Ophthalmic nurses on the other hand work in public hospitals while Opticians mostly work in optical workshops of some clinics and public hospitals (Potter et al., 2013). The GHS has reported

that most Ophthalmologists and Optometrists work in the Kumasi Metropolis with a few found in the peri-urban communities (Potter et al., 2013).

Brong Ahafo

Eye care in this region is provided by Ophthalmologists, Optometrists, Ophthalmic nurses, and Opticians. Unlike the Ashanti region, most Optometrists in this region are in public hospitals and a few are in private practice. Ophthalmic nurses work in public hospitals with or without an Optometrist. Detailed information about Opticians in this region is not available, however, it is known that the Swiss Red Cross eye clinic at the regional capital works with a number of them.

3.4 Sampling procedure

3.4.1 Sampling of eye health professionals

According to Bamfo and Owusu (2012), there were 36 eye care facilities (private and public) in the Ashanti region while available information from the Ghana Optometric Association (GOA), Brong Ahafo branch indicated that there were 22 in the Brong Ahafo region. Thirty-three eye care facilities in Ashanti and 21 in the Brong Ahafo regions were required at a confidence level of 95% and a margin of error of 5% using the Macorr sample size calculator (www.macorr.com). However, since the total number ($n = 58$) was close to the calculated number ($n = 54$), all facilities were included in the study. A list of the eye care facilities was compiled and all of them were visited. One eye care professional from each facility was selected to participate in the study. If there were two or more professionals, only the head of the facility (head of low vision unit where applicable) or someone he or she may choose in his or her stead would participate in the study. In the absence of the head, any one of the remaining eye care professionals could volunteer and fill the questionnaire. Eye care professionals were provided with information documents (Appendix 2) and also had to sign a consent form (Appendix 3) before completing the questionnaire.

3.4.2 Sampling of low vision patients

Purposive and convenient sampling approaches were used to select all patients who were present at the time of study at facilities that provide low vision services. In each facility, only patients who had been verbally confirmed by the eye care professional as having low vision and were present

at the time of the study were interviewed. If the patient was a minor, his or her guardian would be interviewed on his or her behalf. The essence of their inclusion was to obtain their view regarding access to low vision care in terms of costs of services and devices, cost of transportation and travel time to the respective facilities. All patients or their guardians received information documents written in both English (Appendix 4) and Twi languages (Appendix 5) after which they signed or thumb-printed a consent form written in both languages (Appendices 6 and 7) before the interviews were done.

3.4.3 Inclusion criterion

- a. If there was only one eye care professional, he or she would be included after consenting to take part in the study.
- b. If there were two or more professionals, only the head of the facility was chosen to participate in the study or he could delegate another eye care professional if he or she deemed it appropriate.
- c. All low vision patients who were verbally confirmed by eye care professional and were present at the time of study who could understand and respond to the interview were included.
- d. All patients who were minors and had their guardians present at the time of study, and the latter consenting were included.

3.4.4 Exclusion criterion

- a. If an eye care professional decided not take part in the study, he or she was excluded.
- b. In the case where there were more than one eye care professional, once the head of the unit or a delegate consented, all the others were excluded.
- c. All low vision patients who were absent at the time of study were excluded.
- d. All patients who were minors and did not have their guardians present at the time of the study were excluded.

3.5 Data gathering instruments

Data gathering instruments included semi-structured questionnaires (Appendix 11) which were completed by eye care professionals and structured interview (Appendix 12) for the low vision patients. The questionnaire included the following sections:

(A) Demographic information of professional which sought to obtain demographic data of the eye care professionals. (B) Information on Low vision sought the knowledge of the eye care professionals on low vision. (C) Low vision assessment sought to identify the various assessments that were done for low vision patients. (D) Low vision assistive devices (optical) sought to identify prescribed and mostly used optical low vision devices from the eye care professional's perspective. (E) Acquisition and training in the use of devices (optical) sought to obtain information on the ease of acquisition (including costs) of non-optical low vision assistive devices as well as information on training of low patients on the use of these devices. (F) Low vision assistive devices (non-optical) sought to identify prescribed and mostly used non-optical low vision devices from the eye care professional's perspective. (G) Acquisition and training in the use of devices (Non-optical) sought to obtain information on the ease of acquisition (including costs) of optical low vision assistive devices as well as information on training of low patients on the use of these devices. (H) Multidisciplinary approach sought to identify which other professionals were involved in the low vision care. (I) Referral system sought identified if there was any system for referring low vision patients. (J) Perceived challenges sought to find out challenges impeding the low vision care from the perspective of the eye care professional.

Information was obtained from low vision patients through one-to-one interviews (using a structured interview guide) conducted by the researcher and two optometrists (assistants) who had been given comprehensive education on the questions. The structured interview included the following sections: (A) Demographic information about patient. (B) Available eye clinics found out about patients access to eye clinics.

(C) Low vision assistive devices (optical) inquired about among other things the costs, availability, challenges with acquisition and the use of these devices. (D) Low vision assistive device/s (non-optical) inquired about among other things the costs, availability, challenges with acquisition and the use of these devices. (E) Transport asked questions about types and costs of transportation as well as distance travelled to access care. (F) Referral systems identified where patients had been referred from and to whom as well as distance in terms of travel time and associated challenges.

Pilot study

A pilot study was conducted to test the self-administered questionnaire and structured interview. Five eye care professionals from different facilities, which were not part of the study area, were each given the questionnaire (Appendix 11) by the researcher to complete. The questionnaires were hand-delivered and responses collected one month later. Queries that were raised were mainly about ambiguity of questions and repetitions. Ambiguous questions were appropriately rephrased and questions that provided repeated responses were also duly edited. To test the structured interview (Appendix 12), 5 low vision patients from facilities outside the study were interviewed and all queries duly addressed. The results of the pilot study were not included in the data analysis.

Validity: “Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are” (Joppe, 2000). The validity of the findings in this study was maintained as a result of the population being carefully defined with the samples that represent it. The responses to the questionnaire and interviews in the pilot study were compared and they generally agreed (Cohen’s kappa coefficient (k)=0.34), thereby confirming the validity of the study. Appropriate techniques of analysis were used; the descriptive statistics was applied to analyse data using the Statistical Packages for Social Sciences (SPSS) and expert (biostatistician) support was provided to the researcher with design of the questionnaire, data capturing and analysis.

Reliability: “The extent to which results are consistent over time and an accurate representation of the total population under study, is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research is considered reliable” (Joppe, 2000). The reliability in this study was established by including all low vision patients who were present at the time of the study thereby making it a fully inclusive sample. Before the main study, a pilot study was conducted to check the appropriateness of the questionnaire by the researcher and experts (biostatisticians) in questionnaire design and compilation. Self-administered and careful wording of questions as well as one-to-one interviews (using structured interview guide) increased participants’ reliability. All queries that arose from the pilot study were addressed and the questionnaire modified accordingly before the main study was conducted.

3.6 Procedure for data collection

Eye health professionals

The two regions were divided into 57 municipalities or districts (30 for Ashanti and 27 for Brong Ahafo). Within each municipal or district, questionnaires were hand-delivered by the researcher and two optometrists to eye health professionals within each of the 58 eye care facilities. The professionals were assured of confidentiality and their freedom to withdraw from the study through the information document (Appendix 2). Professionals were allowed a period of one month to complete the questionnaire. Follow-up was then made through telephone calls followed by collection (received from eye care professionals at their facilities) of the completed questionnaires by the researcher and two assistants (optometrists). If eye care professionals responded “yes” to the question 6 of section B in the questionnaire (Appendix 11), “Do you currently offer any form of low vision service/s?”, they were counted as providing low vision service.

Low vision patients

One-on-one interviews were conducted with patients to collect the required information. They were interviewed in Twi language (a common local dialect of the two regions) or in English depending on the preference of each participant. If the patient was a minor (younger than 18 years), their care givers were interviewed if they were present at the time of data collection. If their care-givers were absent at the time of study, they were excluded.

In order to quantify availability, the following were determined:

- a. The number of eye care facilities that provided low vision services in each region.
- b. The number and kinds of eye health professionals who provided the low vision services in each region.
- c. Low vision services that are provided (including both optical and non-optical services).
- d. The ease with which low vision devices are obtained.

The following indicators were used to quantify accessibility:

- a. Average travel time to the low vision centre.
- b. Average cost of transport by road to the low vision centre.
- c. Average cost of services that are provided excluding low vision devices.
- d. Average cost of available low vision devices.

3.7 Data analysis

Data analysis was done through the assistance of a biostatistician with Statistical Package for Social Sciences (SPSS) version 20 using the descriptive statistics tool. Both the questionnaire and structured interview guide contained that were categorical, ordinal (likert scale) or open-ended questions under the various sections mentioned in section 3.5. All categorical data were analysed using descriptive statistics tool including mean±standard deviation (sd), mode or median where appropriate. Responses to all open-ended questions were converted to categorical data and analysed as such. Section J of the questionnaire (Appendix 11) involved ordinal (likert scale) data and factor analysis was used to test for statistical significance of differences in observation in which relationships greater than 0.80 were considered significant. Pearson chi-square test and Independent sample t-test were also used to test for statistical significance of differences in observations and a *p* value of less than or equal to 0.05 was considered statistically significant. Costs of low vision services, devices and transportation were quoted in Ghana cedis (GH¢) but converted to United States dollars with the conversion rate US \$1.00= GH¢ 3.00 according to the Bank of Ghana foreign exchange rates as at 30th June, 2014 (at the time of the study).

3.8 Ethical and legal considerations

Ethical clearance to perform this research was obtained from the Biomedical Research and Ethics Committee, University of KwaZulu–Natal (BREC REF: BE438/14) (Appendix 9) and the Ethical Review Committee of the Ghana Health Service (Appendix 10). Gatekeeper permission letters were obtained from the authorities of eye care facilities. Written and signed consent forms were obtained from each subject before carrying out the research. Each subject was informed of the procedures that were used in this research both in writing and verbally. Copies of the consent form and information document were given to each participant.

Participants' identities remained confidential. Each participant was identified by a special number and no participant was identified by name. Any information obtained from participants remained confidential. Participants were assured that no financial commitment was required. Participants were also assured that there were no negative anticipated psychological adverse events by participating in the study. Participants were allowed to withdraw from the study if they wanted to. All the consent forms and questionnaires were stored in locked cupboard for the duration of the study and will remain there for a period of five years after which they will be shredded.

3.9 Conclusion

The results of the study which were obtained by employing the methodology discussed above are presented in Chapter 4 below.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter describes the results of the data analysis which are presented with respect to the study objectives.

4.2 Demographics

4.2.1 Eye care facilities

The questionnaires were delivered to 58 eye care facilities in 21 districts of Ashanti and Brong Ahafo regions of Ghana. Eye care personnel from forty-four eye care facilities from the Ashanti region and 10 from the Brong Ahafo region responded to the questionnaire, giving an overall response rate of 93%. The centres included 35 public, 16 private and 3 non-governmental organisations. The distribution of the districts within which the eye care facilities were located is presented in Table 4.2.1. There were 32 male and 22 female eye care practitioners with mean \pm standard deviation (sd) age of 32.6 ± 6.48 years who responded to the questionnaires on behalf of their facilities. Of these, 49 were optometrists, 4 were ophthalmic nurses and 1 was an ophthalmologist.

Table 4.2.1: The distribution of districts within which the eye care facilities were located

District/Metropolis/Municipal	Number of eye care facilities	Percentage (%)
Kumasi Metropolis	19	35.2
Atwima Nwabiagya District	2	3.7
Berekum Municipal	1	1.9
Wenchi Municipal	1	1.9
Amansie West District	2	3.7
Ejisu Juaben District	3	5.6
Atwima Kwanwoma District	2	3.7
Bosomtwe District	2	3.7
Atwima Mponua District	1	1.9
Bekwai Municipal	3	5.6
Sunyani Municipal	4	7.4
Kintampo North District	1	1.9
Jaman North District	1	1.9
Jaman South District	1	1.9
Tano South District	1	1.9
Mampong Municipal	1	1.9
Asanti Akim North District	1	1.9
Sekyere East District	2	3.7
Obuasi Municipal	3	5.6
Sekyere South District	2	3.7
Offinso District	1	1.9
Total	54	100

4.2.2 Patients

A total of 29 patients which included 16 males and 13 females were interviewed from four different eye care facilities. The mean \pm sd age of the patients was 33.79 ± 17.42 years with minimum and maximum ages of 14 and 80 years respectively. All the patients who were interviewed were attending public hospitals, and most 11 (37.9%) were seen at the Wenchi Methodist Hospital while only 1 (3.4%) was from the Seventh Day Adventist Hospital (SDA) at Kwadaso in Kumasi. Other eye care facilities and the number of patients seen at those facilities are presented in Table 4.2.2 below.

Table 4.2.2: Eye care facility and the number of patients seen in each facility

Facility	Number of patients seen	Percentage (%)
KATH	9	31
SDA	1	3.4
WENCHI METHODIST HOSP	11	37.9
MANHYIA	8	27.6
TOTAL	29	100

4.2.3 Level of patients' education

Twenty-two (76%) of the patients had either acquired or were at secondary school level and 7 (24%) had a tertiary level qualification.

4.2.4 Employment status of patients

Eleven out of the 29 (37.9%) patients were employed at the time of the study while 6 out of the 18 (33.3%) patients who were not employed reported to have left their jobs due to either poor vision or to pursue educational opportunities.

4.3 Objective 1. To determine the level of availability of low vision services provided

4.3.1 Eye care facilities that provided low vision services

Eye care professionals from 50 eye care facilities had low vision patients attending their clinics at different times. Out of this, 33 (66%) did not provide low vision services and 17 (34%) offered the service. The 17 facilities included 10 (58.8%) public, 5 (29.4%) private and 2 (11.8%) non-governmental organisations' eye care facilities whose services were provided by optometrists. The public eye care facilities included 6 (60%) faith-based facilities and 4 (40%) government centres. There was no statistically significant association between type of practice and provision of low vision service ($p = 0.49$). Out of the 17 facilities providing low vision services, 11 (64.7%) were in the Ashanti region while 6 (35.3%) were located in the Brong-Ahafo region. A Pearson chi-square test showed that there was a significant difference in the provision of low vision services between the two regions (chi-square value (df)=4.411(1), $p = 0.036$).

4.3.2 Low vision equipment

The most common equipment available in each of the 17 facilities were direct ophthalmoscopes, trial lens sets (full aperture), universal trial frames, long handle occluder with pinhole, pen torches and measuring tapes. The least available were hand disc perimeter and computer software with text enlargement and voice output. The availability of low vision equipment is shown in Table 4.3.2.1.

Table 4.3.2.1: Low vision equipment available in eye care facilities

Equipment	Number of facilities
WHO Low vision kit	5
Streak retinoscope	15
Direct ophthalmoscope	17
Lensmetre	12
Trial lens set(full aperture)	17
Universal trial frames	17
Paediatric trial frames	7
Trial lens holder	6
Halberg clip	2
Long handle occlude with pinholes	17
Cross cylinders ($\pm 0.5, \pm 1$)	17
Pen torch and measuring tape	17
Vision assessment equipment	
Light box for visual acuity test	7
Distant Logmar test charts-letter, number, tumbling Es, Landolt Cs (one of each type)	8
Near vision tests (same as distant but calibrated for 40cm). reading acuity test (continuous text in English and local language)	8
Symbol paediatric tests for matching and pointing (with and without crowding)	10
Preferential looking system	6
Contrast sensitivity test charts	10
PV-16 colour vision test (double set)	2
Amsler grids	10
Hand disc perimeter	2
Tangent screen	1
Optical low vision devices	
Spectacle magnifiers (half eyes)	4
Foldable and hand-held magnifiers with and without built-in light source	8
Stand magnifiers	4
Dome and bar magnifiers	3
Hand-held monocular telescopes	3
Filters	6
CCTV Devices	
Colour television (20inches)	2
Black and white hand-held CCTV magnifier	3
Full colour hand-held CCTV magnifier	3
Computer with laser printer and scanner	14
Computer software with text enlargement and voice output	1

**CCTV= closed-circuit television*

4.3.4 Types of low vision services provided

The low vision clinical services provided in the 17 facilities ranged from history taking to dispensing of optical and non-optical low vision assistive devices. These services were grouped as “History and symptoms”, “Needs/Goal setting” and “Clinical assessment” (Table 4.3.4.1).

Table 4.3.4.1: The range of clinical low vision services provided

Service provided	Yes	No
History and symptoms		
Visual history	16	1
Ocular history	16	1
Medical history	16	1
Social history	14	3
Duration	14	3
Other disability (Physical/Mental)	13	4
Visual symptoms	15	2
Ocular symptoms	15	2
Medical symptoms	14	3
Social symptoms	14	3
Needs/Goal setting		
	Yes	No
Distance tasks	13	4
Near tasks	14	3
Mobility	11	6
Daily living skills	10	7
Current assistive devices	11	6
Support	9	8
Treatment	9	8
Other needs	7	10
Clinical assessment		
	Yes	No
Distance VA with LogMar chart	7	10
Distance VA with Snellen chart	14	3
Near/reading VA	13	4
Verification of distance prescription	14	3
Verification of near prescription	14	3
Retinoscopy	12	5
Distance refraction	14	3
Near refraction	14	3
Accommodation if relevant	7	10
Establishing magnification	9	8
Contrast sensitivity	5	12
Glare function	5	12
Color vision	7	10
Visual field if relevant	12	5
Low vision assistive devices	9	8
Dispensing LV assistive devices	9	8
Training in use of LV devices	8	9
Advice and referral if necessary	13	4

*VA=visual acuity *LV=low vision

A chi-square test showed that there was no significant difference in the range of clinical low vision services provided between the two regions (chi-square value=12.621(12), $p = 0.397$).

4.3.5 Low vision devices prescribed by eye care professionals

Lighting adjustment 6 (23.08%) was the most common form of advice given to patients. Non-optical devices prescribed are presented in Table 4.3.5.1.

Table 4.3.5.1: Non-optical devices prescribed

Device	Number prescribed	Percentage (%)
Canes	2	7.69
Medicine boxes/bottles selection	3	11.54
News paper	3	11.54
Large print items	3	11.54
Pens	1	3.85
Typoscope	2	7.69
Bookstand and clipboards	2	7.69
Lighting	6	23.08
Talking items	1	3.85
Stickers	1	3.85
Bump-ons	1	3.85
Closed-circuit television	1	3.85
Total	26	99.90

The most common optical devices prescribed by eye care professionals were spectacle magnifiers 8 (30.77%) and non-illuminated hand magnifiers 8 (30.77%) while illuminated stand magnifiers 1 (3.85%) were the least prescribed. The list of optical devices prescribed by eye care professionals is illustrated in Table 4.3.5.2.

Table 4.3.5.2: Optical devices prescribed

Device	Number prescribed	Percentage (%)
Non-illuminated hand magnifier	8	30.77
Illuminated hand magnifier	5	19.23
Non-illuminated stand magnifier	2	7.69
Illuminated stand magnifier	1	3.85
Spectacle magnifier	8	30.77
Telescope	2	7.69
Total	26	100

4.3.6 Acquisition of low vision devices as reported by eye care professionals

Of the 17 eye care professionals from 17 eye care facilities who reported on acquisition of optical low vision devices, 11 (65%) reported that it was difficult to acquire these devices, while 6 (35%) said it was not. With regards to non-optical devices, 15 (88.2%) of the 17 eye care professionals who responded said it was difficult to acquire them and 2 (11.8%) said it was not.

4.3.7 Acquisition of low vision devices as reported by patients

Out of 15 patients who reported on acquisition of optical low vision devices, 11 (73.3%) said that it was either difficult or very difficult to acquire them while 10 (83.3%) of the 12 patients reported the same about non-optical low vision devices. While a chi-square test showed no significant difference in the ease of acquisition of optical low vision devices between regions (chi-square value (df)= 3.667(3), $p = 0.30$), there was a statistically significant difference in the ease of acquisition of non-optical low vision devices between regions (chi-square value (df)= 18.829(3), $p = 0.00$).

Of the 15 patients who responded to the questions on where they acquired their optical devices, 7 (47%) reported that they were donated, 2 (13%) acquired them from the market while 6 (40%) acquired them from the hospital or eye care facilities. The patients obtained non-optical devices mainly from the market 5 (31%) and through donations 5 (31%). Others obtained them from the society for the blind 2 (15%), hospital or eye clinic 2 (15%) and a resource centre 1 (8%).

4.4. Objective 2. To determine the level of accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

4.4.1 Cost of services

Nine eye care facilities reported on the cost of services. The mean \pm sd cost of services was GH¢28.22 \pm 10.95 (\$9.4 \pm 3.65) with a modal and median costs of GH¢30 (\$10) each.

4.4.2 Cost of devices

4.4.2.1. Cost of devices reported by eye care professionals

Eight eye care professionals from 8 facilities reported that the average cost of optical devices ranged from low to high, the low costs being from GH¢20 (\$6.7) to GH¢300 (\$100) (mean = GH¢142.5 \pm 102.4) (\$47.5 \pm 34.1) and a median cost of GH¢175 (\$58.3), while high costs were from GH¢20 (\$6.7) to GH¢3000 (\$1000) (mean = GH¢488.3 \pm 260.8) (\$162.8 \pm 86.9) with a median cost of GH¢400 (\$133.3). For non-optical devices, 6 facilities reported on their costs which were also divided into low and high costs. Low costs ranged from GH¢5 (\$1.7) to GH¢150 (\$50) (mean = GH¢22.5 \pm 18.9) (\$7.5 \pm 6.3) with a median of GH¢15 (\$5), and the high cost ranged from GH¢120 (\$40) and GH¢2800 (\$933.3) (mean = GH¢803.3 \pm 941.4) (\$267.8 \pm 313.8) with a median of GH¢375 (\$125). The average cost of optical devices between regions showed that the low cost of optical devices was higher in the Brong-Ahafo region than in the Ashanti region. However, using the independent sample t-test, this difference was not statistically significant (T value (df)= -0.631(6), p =0.55). The high cost of optical devices was higher in the Ashanti region than in the Brong-Ahafo region, the difference being statistically insignificant (T value (df)= 1.052(6), p = 0.33).

The average cost of non-optical devices was higher in the Ashanti region than the Brong-Ahafo region by GH¢ 315.00 (\$105). However, independent sample t-test showed that the difference was not statistically significant (T value (df)= -0.849(9), p =0.42).

4.4.2.2. Cost of devices reported by patients

Patients attending the eye care facilities that provided low vision services reported that the costs of non-optical devices ranged from low (GH¢20 to GH¢40) (\$6.7 to \$13.3), mean = GH¢31.25±8.35) (\$10.4±2.8) to high (GH¢500 to GH¢1100) (\$166.7 to \$366.7), mean=GH¢700±346.41 (\$233.3±115.47). The cost of optical devices ranged from GH¢25 (\$8.3) to GH¢700 (\$233.3) and had a mean of GH¢235±177 (\$78.3±59).

4.4.3 Cost of transport to low vision centres reported by patients

Patients reported that the cost of transport to their nearest low vision centres ranged from a low (GH¢2.00 (\$0.7) to GH¢15.00 (\$5) with a mean cost of GH¢6.00±3.02 (\$2±1.01)) to high (GH¢20 (\$6.7) to GH¢70.00 (\$23.3) with a mean cost of GH¢39.17±18.55) (\$13.1±6.2). An independent sample t-test indicated that the cost of transportation to low vision centres was higher in Ashanti region than the Brong-Ahafo region. However, the difference did not reach statistical significance (T value (df)= 0.345(26), $p = 0.73$)

4.4.4 Travel time taken by patients to reach low vision centre

Patients reported that the average travel times to reach KATH and Koforidua were 1.31±1.15 hours and 5.06±2.00 hours respectively. The average travel time to low vision centres was longer from Brong-Ahafo region than from Ashanti. However, this difference was not significant (T value (df)=-1.506(10), $p = 0.16$).

4.5 Objective 3. To determine the patterns of utilisation of low vision devices in Ashanti and Brong Ahafo regions of Ghana

4.5.1 Pattern of utilisation of low vision devices reported by patients

A total of 19 out of the 29 (65.5%) patients indicated that they used low vision devices. Of this number, 11 (57.9%) used both optical and non-optical devices while 4 (21.05%) used optical devices only and 4 (21.05%) used non-optical devices only. The least and highest numbers of non-optical devices per patient were 1 and 10 respectively (mean±sd = 4.09±2.65 non-optical devices

per patient) whereas those for optical devices were 1 and 4 respectively (mean±sd = 2±1.2 devices). Patients reported that spectacle magnifiers constituted the most commonly used optical device (12 (40%) of all optical devices) while bar and stand magnifiers (illuminated and non-illuminated) were the least optical devices used by patients (1 (3.33%) of all optical devices). The mostly used non-optical device by patients was lighting adjustment which constituted 10 (11.1%) of all non-optical devices used. Mats, bump-ons and scissors assistive devices were the least utilised non-optical devices by patients (each constituting 1 (1.1%) of all non-optical devices). Overall, the most commonly used low vision assistive device by patients was spectacle magnifiers which constituted 12 (10%) of all low vision devices.

4.6. Objective 4. To determine referral centres and challenges faced by eye care practitioners in providing low vision care

4.6.1 Referral centres used by eye care professionals

Patients were referred by eye care professionals to two main centres, these being the Komfo Anokye Teaching Hospital (KATH) in Ashanti region and the Eastern Regional Hospital in Koforidua.

4.6.2 Challenges faced by eye care practitioners in providing low vision care

When eye care professionals were asked about the challenges they faced in providing low vision services, 47 (87%) and 51 (94.4%) reported that lack of equipment and assistive devices respectively were the most common challenges that they experienced. Other challenges reported by eye care professionals are presented in Figure 4.6.2.1. Factor analysis showed that lack of equipment was considered the significant challenge (0.877) of eye care practitioners in their provision of low vision care (Fig. 4.6.2.1).

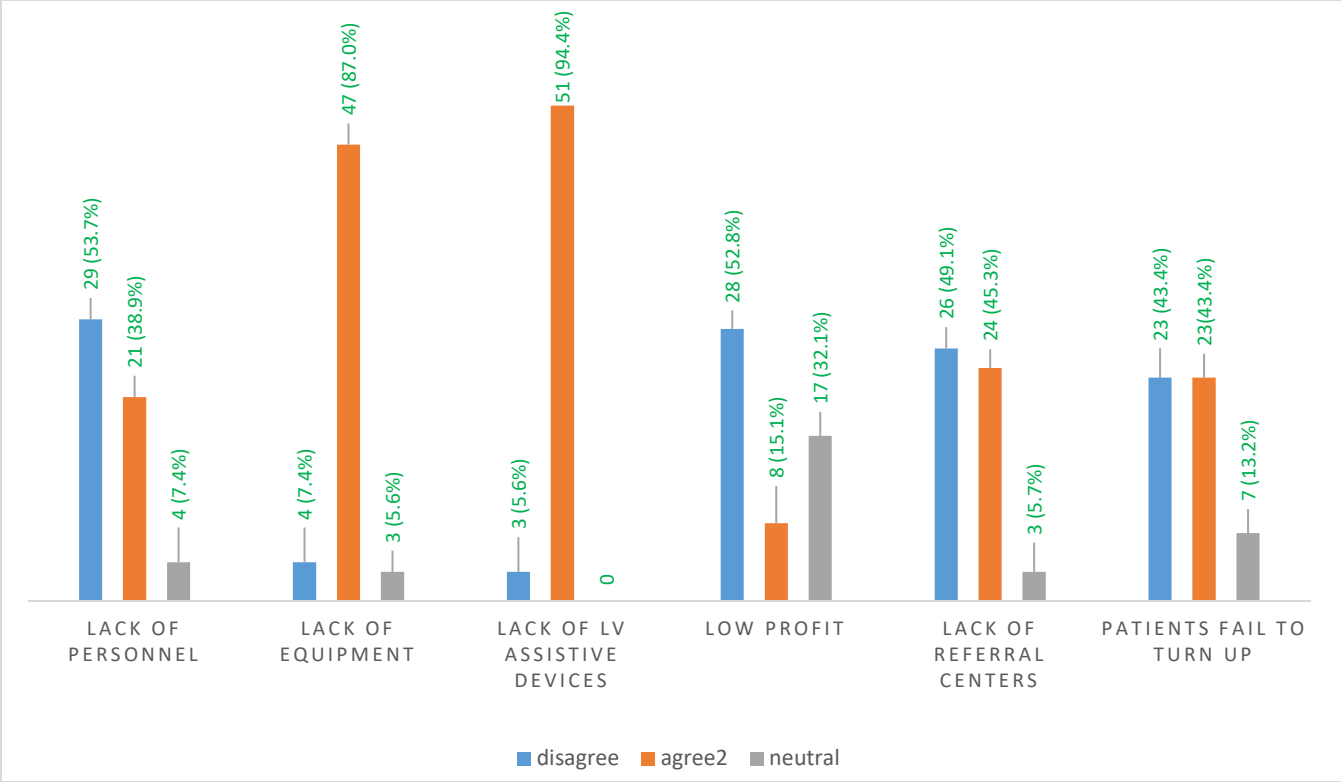


Figure 4.6.2.1: Eye care professionals’ responses regarding their challenges to providing low vision care

Eye care professionals were also requested to report on what they perceived to be barriers preventing their patients from seeking low vision care. Forty-seven (88.7%), 38 (70.4%) and 32 (59.3%) eye care professionals agreed that lack of awareness, high cost of devices and socially unacceptable devices, respectively, were barriers to seeking low vision care by patients. This and other responses are presented in Figure 4.6.2.2.

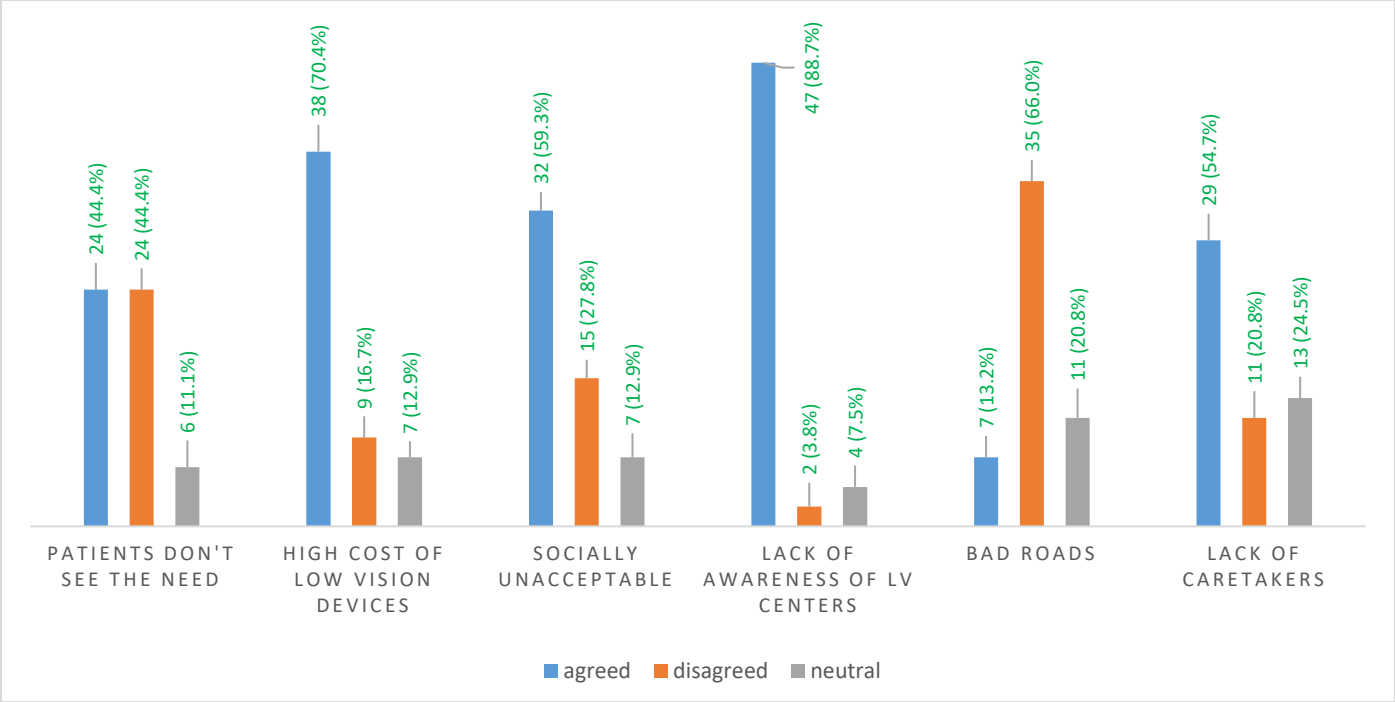


Figure 4.6.2.2: Eye care professionals’ perceptions of barriers experienced by patients in seeking low vision care

4.7 Conclusion

The availability and accessibility of low vision services were determined in two regions of Ghana. In addition, patterns of utilisation of low vision services and referral centres were determined. The discussion of the results obtained is detailed in Chapter 5.

CHAPTER 5: DISCUSSION

5.1 Introduction

The main findings are discussed in the following sub-sections with respect to the study objectives and in comparison with findings from other studies.

5.2 Demographics

5.2.1 Eye care facilities

The results of the study show that most eye care facilities and practitioners were located in urban areas. For instance, 35% of eye care facilities were located within the Kumasi metropolis alone. The implication of this is that many rural dwellers have little or no access to eye care services. Integrating eye care into the general public health care system and establishing eye care facilities at the community level could help improve this challenge. Similar results have also been reported in other parts of Ghana (Potter et al., 2013). Participating eye care practitioners had a mean \pm sd age of 32.6 \pm 6.48 years, suggesting that the eye care workforce in Ghana is relatively young. This result confirms the report by Boadi-Kusi et al. (2015), who found that the mean age of optometrists in Ghana was 28.97 \pm 3.36 years. Most of the participating professionals were optometrists possibly because it was easier accessing them compared to other eye care professionals.

5.2.2 Facility where patients were seen

All the patients seeking low vision services were seen in public health facilities, most being seen at the Wenchi Methodist Hospital. The relatively cheaper cost of services in public facilities which are enrolled with the National Health Insurance Scheme (NHIS), which subsidises medical costs of patients could account for the high patronage of public health facilities by low vision patients. Extending the scheme to cover private facilities could be an incentive and motivate private eye clinic operators to expand their services to more patients, including those in the rural and remote areas of Ghana. The Wenchi Methodist Hospital had the highest number of low vision patients possibly due to the close proximity of a special school for the blind whose students primarily seek health care from this facility. Other studies have also shown that low vision care is mainly provided at hospital eye clinics (Culham et al., 2002).

5.2.3 Low vision patients

Of the 29 patients who were interviewed, there were more males (55.2%) than females (44.8%). This could be due to higher prevalence of low vision among males or poor uptake of low vision services by females in Ghana. However, further investigations are required to accurately understand this trend. This finding is similar to other studies which have shown that there are more male low vision patients than females (Pambo, 2013; Khanal and Lama, 2013). In a study investigating the quality of life of patients with low vision attending Korle-Bu and Eastern regional hospitals, it was found that 54% of the patients were males and 46% females (Pambo, 2013). Khanal and Lama (2013) found in their study that the profile of the low vision population attending a low vision clinic at a peripheral eye hospital in Nepal had 70.7% of the participants were males and 29.3% were females. However, other studies have reported contrasting results about the gender distribution of low vision patients (Robbins, 1981; Hill and Cameron, 1987). Khanal and Lama (2013) attributed the gender disparity to gender-based discrimination and easy access to hospitals by males. Cultural and social factors have also been cited to be contributory factors to the gender disparity in the numbers attending low vision services (Levesque et al., 2013).

The relatively young mean age of the patients reflects the general age trend in Ghana (GSS, 2012). Although low vision is generally known to increase with age (Abdull et al., 2009), the current study shows that a relatively younger population is affected by low vision possibly due to undiagnosed and or untreated eye problems during their early ages. Similar results were also reported by Pambo (2013) who found a mean \pm sd age of 46 ± 23.4 years in low vision patients from the Korle Bu Teaching Hospital and Eastern regional hospital in Ghana and attributed the observation to the etiology of the visual impairment.

Low vision had negatively impacted the life of some patients costing them their jobs, thus affirming the fact that low vision correlates positively with social variables such as unemployment, motor vehicle collision and depression among others (WHO, 2004; Biza et al., 2013; Evans et al., 2007; Hassell et al., 2006). However, some patients could pursue their education probably due to the use of the low vision devices as studies have proven that when low vision services are made available to patients, they can enjoy the same quality of life as those with normal eyesight (Barbie 2004).

5.3 Objective 1. To determine the level of availability of low vision services provided in Ashanti and Brong Ahafo regions in Ghana

5.3.1 Eye care facilities that provided low vision services

The number of eye care facilities that provided low vision care in the Ashanti and Brong Ahafo regions were relatively low with 34% of facilities reporting that they provided some form of low vision services. There was a significant difference in the provision of low vision services between the two regions possibly due to relative access to low vision equipment and assistive devices by the eye care facilities. The low number of facilities providing low vision care could be due to non-availability of equipment and low vision assistive devices. This view is supported by the fact that participating practitioners cited these factors as major barriers to the provision of low vision services. The results agree with those of other studies (Culham et al., 2012; Silver et al., 1995). For example, 33% of eye care providers offered low vision services in the United Kingdom (Culham et al., 2002). Studies in Uganda and Kenya have also shown that low vision services were inadequate (Silver et al., 1995).

5.3.2 Low vision services provided

Low vision services that were provided ranged from history taking to dispensing of low vision assistive devices. These results are not unexpected as some of the techniques form part of routine eye examination and are not necessarily unique to low vision patients. These techniques include case history taking, measurement of visual acuity with Snellen charts, verification of old prescription, refraction and visual field tests. The least performed tests were contrast sensitivity and glare function tests. Although contrast sensitivity test is needed for the assessment and monitoring of visual function and also for the prediction of vision-related ability (Woods and Wood, 1995), only 5 out of the 10 facilities which reported owning contrast sensitivity test charts carried out that test (Tables 4.3.2 and 4.3.4.1). This low number could be attributed to inadequate skills on the part of the clinicians as previous research has reported inadequate training as a barrier to providing comprehensive low vision services by optometrists in Ghana (Boadi-Kusi et al., 2015).

The logMAR chart is important in low vision assessment because it has the ability to measure and score visual acuities accurately and has a regular progression which allows for inter-row

interpolation of visual acuity values (Oduntan et al., 2009). These properties allow accurate calculation of magnifications. Notwithstanding the superiority of the logMAR chart in low vision care, only 8 facilities owned it (Tables 4.3.2) and this might be due to its complexity in recording and interpreting as compared to the simplicity of the Snellen charts. Other studies have also reported that the use of Snellen notation, particularly in clinical practices is obviously due to the relative simplicity of the method compared to the logMAR system (Moutray et al., 2008).

5.3.3 Low vision devices prescribed by eye care professionals

The most common non-optical device prescribed was lighting adjustment possibly because it was cheaper to access and easier to use. Patients might not need to spend extra money to acquire proper lighting system as they may only have to adjust their existing sources of light at home. In some instances, patients may have to sit near a window (Ager, 1998) to make use of natural light. The use of non-optical device such as lighting has been reported to be easy (Monteiro et al., 2014) and advice on its use can be provided by any appropriately trained eye care worker (Minto and Butt, 2004). This finding agrees with previous research which found that direct illumination was the most commonly prescribed non-optical aid among visually impaired Egyptian patients (Shaaban et al., 2009). Spectacle and non-illuminated hand magnifiers were the most prescribed optical devices while telescopes and stand magnifiers were the least. This suggests that most of the patients had near than distance visual demands since both devices are mainly used for near work (Ager, 1998).

Spectacle magnifiers were the most prescribed optical devices (Minto and Butt, 2004) possibly due to their social acceptability and flexibility in their use; as patients can perform other tasks when wearing them because both hands are left free. The non-illuminated hand magnifiers prescribed might be simple low-powered ones which are inexpensive as indicated by previous reports (Ager, 1998; Blazé, 2009). A study by Ekpenyong and Ndukwe (2010) also found spectacle magnifiers to be the most commonly prescribed optical device among patients from the low vision clinic of the University of Calabar in Nigeria citing their high durability, availability and patient acceptability as reasons for their dominance. Telescopes were the least prescribed optical device which could be due to the fact that most patients had more near visual demands than distance. Stand magnifiers are simple to use but their non-availability, bulky nature and high cost could

explain why practitioners least prescribed them. However, telescopes and stand magnifiers for distance and near visions respectively have been reported in other studies to be the most commonly prescribed optical devices (Khanal and Lama, 2013).

5.3.4 Acquisition of low vision devices

Both eye care professionals and patients reported that it was not easy to acquire low vision devices, whether optical or non-optical and that patients mostly acquired the devices from either donations or the market while a few also obtained them from hospital or eye clinics. The difficulty in acquiring low vision devices could be because they were not available in most eye care facilities. This suggests that there is no particular system to ensure the ready supply of low vision devices to eye care facilities. It is also possible that if they were available, they might be too expensive for patients to purchase. These could force patients to depend on alternative sources such as donations and other areas that may not be certified to dispense low vision devices. In such instances, patients may not obtain their correct prescriptions therefore they will have very little or no benefit at all if they depend on devices from uncertified vendors. Again, increased falls have been reported among people who suffer profound visual deterioration (Lord, 2001; Ivers et al., 2003) and such patients going around in search of assistive devices increase their inconvenience and other risks. In a previous study, it was found that most patients had purchased their low vision assistive devices from either a pharmacy or received it from a relative (Casten et al., 2005).

5.4 Objective 2: To determine the level of accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

5.4.1 Cost of services and assistive devices

The cost of services and assistive devices from the perspective of practitioners and patients showed considerable variations among eye care facilities and between regions. These variable trends of costs could be attributed to the autonomy of facilities in determining their own prices. Business operators in Ghana are at liberty to determine their own prices due to the lack of a controlled pricing system in the country, particularly in the eye care industry. Such situations can create uncertainties about costs among eye care practitioners and patients alike, thereby making

budgeting for eye care needs more challenging. Previous studies have shown that inconsistent and unpredictable costs of services are barriers to the uptake of emergency obstetric and newborn services in Sierra Leone (Oyerinde, et al., 2012) and this could be the case with low vision care in Ghana.

5.4.2 Cost of transportation

Costs of transport also varied widely and this is expected because patients travelled different distances to access facilities that were largely located in a few areas. Although our study did not investigate the impact of these costs on the uptake of low vision care, other studies have shown that high costs of transport among other factors is a barrier to accessing health care by most households in Ghana, particularly services that require referrals (Broni et al., 2014).

5.4.3 Travel time taken by patients to reach low vision centre

The difference in travel times indicates that patients took relatively shorter time to access care at KATH than Koforidua and this was because the study involved facilities within the Brong Ahafo and Ashanti regions which are geographically closer to KATH (located within Ashanti region) than Koforidua in the Eastern region. It will therefore be more convenient for patients within the two regions to seek care at KATH or other facilities within either region rather than Koforidua as longer travel times can potentially hinder access to proper health care and encourage patients to seek alternative care (Ntim-Amponsah et al., 2005).

5.5 Objective 3: To determine the patterns of utilisation of low vision devices in Ashanti and Brong Ahafo regions of Ghana

5.5.1 Patterns of utilisation of low vision devices

Many low vision patients used multiple low vision devices and the mean number of non-optical devices per patient was approximately twice as much as that of optical devices. Multiple devices help patients with profound visual loss to enhance maximum functioning. Depending on the visual acuity of patients, they may have to use many devices in order to achieve maximum vision. Patients

with poorer vision are more likely to use more devices than those with better vision and this assertion is supported by the findings of Casten et al. (2005) who showed that patients who had worse vision used more services and devices compared to those with better vision.

Non-optical devices were used more because they are easier to obtain (Lee and Cho, 2007) and easier to use (Monteiro et al., 2014). According to Minto and Butt (2004), non-optical devices operate by altering environmental perception through enhancing illumination, contrast and spatial relationship thus making access to them easier and cheaper. It is also possible that there were more non-optical aids because they were used as adjuncts to optical devices in order to achieve optimal benefit as they can be used to compensate for some of the disadvantages of optical devices (Lee and Cho, 2007). Shaaban et al. (2009) found that non-optical low vision aids were prescribed more than optical devices. The authors did not report the reasons for their observations.

5.6 Objective 4: To determine referral centres and challenges faced by eye care practitioners in providing low vision care

5.6.1 Referral centres

Patients were referred mainly to two facilities, the Komfo Anokye Teaching Hospital (KATH) eye clinic and the Eastern regional hospital. At the time of the study, these were the hospitals with established low vision clinics. At the end of our study, there were some other eye care facilities that provided various spectrums of low vision care. It is also possible that the eye care practitioners were not aware of these other facilities. It is suggested that a networking system be established among eye care practitioners to create awareness and an effective referral system. Chiang et al. (2011) reported that unawareness of low vision services among eye care practitioners negatively affects referral of patients.

5.6.2 Challenges faced by eye care practitioners

Eye care practitioners agreed that lack of equipment (87%) and lack of low vision devices (94%) were major challenges to the provision of low vision care. Lack of low vision devices has been reported as a barrier to low vision care in many publications (Khan et al., 2005; Okoye et al., 2007). For instance Boadi-Kusi et al. (2015) reported that in Ghana, 76% of optometrists indicated

unavailability of low vision devices as a major barrier to providing low vision services. The current study did not only find the lack of low vision assistive devices to be the major barrier but also the lack of low vision testing equipment. The availability of low vision testing equipment is fundamental to the provision of low vision services. In order for eye care facilities to practice full scope low vision optometric care, it is recommended that they have adequate and appropriate equipment. In addition, low vision assistive devices should be made available and accessible.

Practitioners also felt that unawareness of low vision centres, high costs and social unacceptability of devices were major barriers to patients accessing low vision services. These findings agree with those of Ekpenyong and Ndukwe, (2010) which reported that poor acceptance of the use of devices due to cosmetic reasons, durability and cost, lack of adequate referral and ignorance constituted the basic challenges faced by patients. As part of the integration of eye care into the general health care system, education on visual impairment and low vision services at the community level as well as the inclusion of the costs of some low vision devices in the NHIS is therefore recommended.

5.7 Conclusion

Low vision care is provided by optometrists in a few eye care centres with spectacle magnifiers being the most commonly prescribed and used devices. The provision of these services is compromised by the lack of testing equipment, lack of assistive devices and high cost of services.

5.8 Limitations of the study

The following limitations of the study are acknowledged.

- This was a quantitative study based on questionnaires and structured interviews, and is therefore subject to all the shortcomings of quantitative study, including a limited in-depth understanding of the participants' responses.
- Limited funding was a major challenge and the researcher was not able to cover a wider scope, hence the small sample size which could negatively impact the generalizability of the study.

5.9 Recommendations and further study

Based on the findings of this research, it is recommended that:

- Eye care facilities in Ashanti and Brong Ahafo regions should be equipped with basic low vision testing equipment and assistive devices in order for practitioners to practice full scope low vision services. This will help to reduce the burden associated with low vision and visual impairment.
- A situational analysis study of low vision services should be conducted in Ghana.

CHAPTER 6: CONCLUSION

6.1 Introduction

This chapter provides the conclusion, limitation of the study, recommendations and suggestions for future studies.

6.2 Conclusion

The specific objectives of the study were met as follows:

Objective 1. To determine the availability of low vision services provided

The study showed that only 17 eye care facilities provided some low vision care in both Ashanti and Brong Ahafo regions and that the services were provided by optometrists. The services that were provided included routine eye care examination through the dispensing of low vision assistive devices. Eye care practitioners and patients reported that it was not easy to acquire prescribed low vision assistive devices.

Objective 2: To determine the accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

The costs of low vision services and assistive devices varied considerably among the different eye care facilities. The cost of transportation for patients also varied substantially. The results of the study also showed that patients who were referred to low vision centres had to travel for long hours before they could access the required services.

Objective 3: To determine the patterns of utilisation of low vision devices in Ashanti and Brong Ahafo regions of Ghana

Spectacle and non-illuminated hand-held magnifiers were the most prescribed optical devices while telescopes and stand magnifiers were the least prescribed. The most common non-optical device prescribed was lighting. Among patients, spectacle magnifiers were the most commonly utilised optical device while bar magnifiers were the least used. In addition, patients reported utilisation of multiple low vision assistive devices.

Objective 4: To determine referral centres and challenges faced by eye care practitioners in providing low vision care

Eye care practitioners referred patients to Komfo Anokye Teaching Hospital and the Eastern regional hospital at Koforidua although some low vision patients were seen at other facilities. Major challenges faced by the practitioners included lack of low vision testing equipment and low vision assistive devices. Additionally, they believed that lack of awareness on the part of patients, high cost of low vision assistive devices and socially unacceptable devices were the challenges that prevented patients from the uptake of low vision services.

6.5 Concluding statement

This research reports on the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana. The study has significant merit as there are no previous data on this subject in these regions. The study highlighted that the availability and accessibility of low vision services are limited in the Ashanti and Brong Ahafo regions. Pragmatic measures are thus needed to address these challenges in order to minimise the burden of visual impairment and blindness in these regions.

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APPENDICES

Appendix 1

Letter to eye care facilities

PRIVATE BAG X54001
DURBAN
4000
SOUTH AFRICA



DISCIPLINE OF OPTOMETRY
COLLEGE OF HEALTH SCIENCES
WESTVILLE CAMPUS

Tel: +27 (0) 31 260 7352

Fax: +27 (0) 31 260 7666

Head/In-Charge of Facility

Dear Sir/Madam,

RE: PERMISSION TO CONDUCT A STUDY AT YOUR FACILITY

I am a master's student in optometry at the University of KwaZulu-Natal Westville. I am currently pursuing a research study entitled: The availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana.

The aim of this study is to determine how available low vision services are in the two regions and to what extent patients are able to access such services. The study seeks to identify eye care facilities in the two regions that provide low vision services, identify the pattern of utilisation as well as referral centres. Eye care professionals from each eye care facility in the two regions will be required to complete a structured questionnaire. In facilities where low vision services are available, patients presenting at these clinics will be interviewed by the principal investigator.

The findings of this study will provide information on availability, access, barriers to low vision services. The information will assist in identifying districts that lack low vision services so that

appropriate strategies can be devised to address these challenges and improve research output in this field. I therefore request permission to conduct this study at your facility.

For further information you can contact my supervisors;

Professor Khathutshelo Percy Mashige

Email: mashigek@ukzn.ac.za

+27824652699

For any queries about the research study contact: The Biomedical Research Ethics Committee (BREC) at the University of KwaZulu-Natal

Email: BREC@ukzn.ac.za

Tel: 031-260 4769 or 031 260 1074

Thank you in advance for your cooperation.

Yours faithfully



Dr. Sylvester Kyeremeh (student)

University of KwaZulu-Natal

Discipline of Optometry, School of health Sciences

Email: kyeremehs84@yahoo.com, kyeremehs84@gmail.com

Cell: +233209350842, +233544172089

Appendix 2

INFORMATION DOCUMENT FOR EYE EHEALTH PROFESSIONALS

Research title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana.

Dear Eye Health Professional,

My name is Dr. Sylvester Kyeremeh, a master's student at the University of KwaZulu-Natal, Westville, cell: +233209350842/+233544172089 or email kyeremehs84@yahoo.com/kyeremehs84@gmail.com.

You are being invited to consider participating in a study that involves research on the availability and accessibility of low vision services in the Ashanti and BrongAhafo regions of Ghana. The purpose of the study will be to assess low vision services are available in the Ashanti and Brong Ahafo regions and to what extent those services are accessible to patients. The study seeks to identify resource distribution, available workforce, barriers to access services, services offered, identifying the pattern of utilisation, referral centres and spread of information on availability of services. In the study, eye health professionals will be required to respond to structured questionnaires.

There are no risks involved in this study. The questions in the questionnaire will not cause any emotional discomfort to the subjects. You are under no obligation to participate in the study and can withdraw at any time during the study, even after you have agreed to participate. All consent forms and data sheets will be secured under lock and key and information treated confidential. Therefore, to fulfill part of the study objectives, you are requested to fill in the questionnaire that will take approximately 15-20 minutes.

Thank you in advance for agreeing to fill in the questionnaire

In the event of any problems or concerns/questions you may contact the researcher at kyeremehs84@yahoo.com/kyeremehs84@gmail.com or Hannah Frimpong, GHS-ERC Administrator on +233 302 681109, +233 (0) 243235225or 0507041223, Email: Hannah.Frimpong@ghsmail.org or UKZN Biomedical Research Ethics Committee, contact details as follows: Email: BREC@ukzn.ac.za, Tel: 031-260 4769 or 031 260 1074

For further information, you can contact my supervisors;

Professor Khathutshelo Percy Mashige

Email: mashigek@ukzn.ac.za

+27824652699

Appendix 3

CONSENT FORM FOR HEALTH OFFICIALS

Research title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana.

Declaration by participant

I (Name).....hereby confirm that I have been requested to voluntarily participate in a research study on the availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana. I have read the briefing document provided and the contents thereof which are written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been clearly addressed and I understand what my involvement in the study means.

I confirm that I am voluntarily participating in the study and understand that all information will be kept confidential and that at no time will I be identified in the presentation of the results. Furthermore, I am aware that I have the right to refuse to participate or end my participation at any point. I consent that my data collected in this study may be used for future research.

I am aware that should I have any queries, or if I have questions about my rights as a research participant, I may contact Hannah Frimpong, GHS-ERC Administrator on +233 302 681109, +233 (0) 243235225 or 0507041223, Email: Hannah.Frimpong@ghsmail.org or UKZN Biomedical Research Ethics Committee, on 031-260 4769 or 031 260 1074 or Dr. Sylvester Kyeremeh on +233209350842/+544172089 or Professor Khathutshelo Percy Mashige on +27824652699

Signature of Participant

Date

Place

Appendix 4

INFORMATION DOCUMENT FOR PATIENTS

Research title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

Dear Participant,

My name is Dr. Sylvester Kyeremeh, a master's student at the University of KwaZulu-Natal, Westville, cell: +233209350842/+233544172089 or email kyeremehs84@yahoo.com/kyeremehs84@gmail.com. You are being invited to consider participating in a study that involves research on the availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana.

The purpose of the study will be to assess how low vision services are available in the Ashanti and Brong Ahafo regions and to what extent those services are accessible to patients. The study will involve interviewing low vision patients. The information obtained will be used to inform the planning and provision of low vision services. The information will also assist in identifying areas that lack low vision services so that appropriate strategies can be devised to address eye care health challenges in low vision.

There are no risks involved in this study. The interview questions will not include any information you deem personal and any information you provide will be kept confidential. You are under no obligation to participate in the study and can withdraw at any time during the study, even after you have agreed to participate. All consent forms and data sheets will be secured under lock and key.

Therefore, to fulfill part of the study objectives you are requested to respond to the interview that will take approximately 10-15 minutes.

Thank you in advance for agreeing to respond to the interview.

In the event of any problems or concerns/questions you may contact the researcher at kyeremehs84@yahoo.com/kyeremehs84@gmail.com or Hannah

Frimpong

GHS-ERC Administrator

Office: +233 302 681109

Mobile: 233 (0) 2432352225 or 0507041223

Email: Hannah.Frimpong@ghsmail.org

or

UKZN Biomedical Research Ethics Committee, contact details as follows: Email:

BREC@ukzn.ac.za

Tel: 031-260 4769 or 031 260 1074

For further information you can contact my supervisors;

Professor Khathutshelo Percy Mashige

Email: mashigek@ukzn.ac.za

+27824652699

Appendix 5

TWI TRANSLATION OF INFORMATION DOCUMENT FOR PATIENTS

Ɔdɔfoɔ a woka nhwehwemu yi ho,

Me din de Dr. Sylvester Kyeremeh. Meye sukuuni wɔ KwaZulu-Natal suapɔn mu wɔ Westville. Wobetumi afɔre me wɔ ahoma yi so: +233209350842/+544172089 anaa wobetumi atwere me afa kyerehems84@yahoo.com/kyerehems84@gmail.com.

Yen dwumadie ne se yereye nhwehwemu afa mmere anaa den a eye ma obi a n'adehunu akɔ fɔm koraa se ɔbenya ayarehwe wɔ Asante ne Bono Ahafo ammantam mmienu no mu.

Nhwehwemu yi botae ne se, yebetumi ahunu beae a obi a n'adehunu akɔ fɔm koraa no benya ayarehwe ne mmere anaa den a eye se obi a ɔte saa no benya saa ayarehwe yi.

Wɔ nhwehwemu yi mu no, yebebisaa wo nsem binom ama w'ayiyi ano. mmuaee a yebeny a no beboa ama yen aye nhyehyee pa de aboa ani ayarehwe. Afei nso ebeboa ama y' ahunu amantam mmienu yi mu beae ahodoɔ a wɔnni baabi a obi a n'adehunu akɔ fɔm koraa no benya ayarehwe.

Nhwehwemu yi fa baabiara nni hɔ a ede ɔhao anaa opira bi bebere wo. Nsemmisa no nso nye adee a ebefa woankasa w'abrabɔ anaa wo sumasem bi ho. Na mpo mmuaee a yebenya afiri wo hɔ no, ye de be sie. Enhye biara nso nnim se etwa se woka dodoɔ a yebisa wɔn nsem no ho. Emom woankasa wofiri wope mu na mpo bere biara a wope no , wotumi sesa w'adwen se wobeka nhwehwemu yi ho. Se yewie nhwehwemu yi a, mmua ee a yebenya no, yede besie a obiara nya ho kwan.

Eno nti wɔ anidie kwan so no, sedee wobeeboa ama nhwehwemu yi anya ne botae nti ye sere se wobeyi nsemmisa yi nom a yebewie no sima beye 10-15 ntam no ano.

Yedi kan de aseda ma wo se woagye atum se wobeyi nsemmisa yi ano.

Se eba se wowɔ hao bi anaa nsembisa bi a, wobetumi atwere me afa kyerehems84@yahoo.com/kyerehems84@gmail.com anaa

Hannah Frimpong

GHS-ERC Administrator

Office: +233 302 681109

Mobile: +233 (0) 243235225 or 0507041223

Email: Hannah.Frimpong@ghsmail.org

anaa

UKZN Biomedical Research Ethics Committee,

Email: BREC@ukzn.ac.za

Tel: 031-260 4769 or 031-260 1074

Wobetumi nso ne me npaninfoɔ a wɔdi manim wɔ nhwehwemu yi mu nso akasa:

Professor Khathutshelo Percy Mashige

Email: mashigek@ukzn.ac.za

+27824652699

Appendix 6

CONSENT FORM FOR PATIENTS

Research title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

Declaration by participant

I (Name).....hereby confirm that I have been requested to participate in a research study on the availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana. I have read the briefing document provided and the contents thereof which are written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been clearly addressed and I understand what my involvement in the study means.

I confirm that I am voluntarily participating in the study and understand that all information will be kept confidential and that at no time will I be identified in the presentation of the results. Furthermore, I am aware that I have the right to refuse to participate or end my participation at any point. I consent that my data collected in this study may be used for future research.

I am aware that should I have any queries, or if I have questions about my rights as a research participant, I may contact the Hanna Frimpong, GHS-ERC Administrator on +233 302 681109, +233 (0) 243235225 or 0507041223 or Hannah.Frimpong@ghsmail.org, or UKZN Biomedical Research Ethics Committee, on 031-260 4769 or 031 260 1074 or Dr. Sylvester Kyeremeh on +233209350842/+544172089 or Professor Khathutshelo Percy Mashige on +27824652699

Signature of Participant

Date

Place

Appendix 7

TRANSLATED CONSENT FORM FOR PATIENTS

Research title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

Obi a ɔka nhwehwemu no ho no pae mu ka

Me (wo din) gye to mu se w'aka akyere me semen ka nhwehwe mu a efa mmere anaa den a eye ma obi a n'adehunu ako fom koraa se ɔbenya ayarehwe wo Asante ne Bono Ahafo ammantam mmienu no mu.

Me gye to mu se benim nnoɔma a ebekɔ saa nhwehwemu yi mu efiri se w'atwere no wo kasa a metumi te asee paa yie a menni ɔhao biara wo ho.

Manya kwan abisa nsem a mente asee na w'akyere me biribiara ase a mete nsonsuansoɔ a ewɔ ka a meka saa nhwehwemu yi ho no ase.

Megye to mu na mefoa so nso se mefiri m'ankasa me pe mu na mereka nhwehwemu yi ho. Me te asee se nsem a nhwehwemu yi de beba biara ye dee ebeye sumasem a obiara nsa nka; na me nipaban nso enye dee nhwehwemu yi beda no adi anaa ede beto dwa ama amansan ahu.

Afei benim se mewɔ ho kwan se mefiri nhwehwemu yi mu bere biara a m'ankasa mepɛ a ɔhye biara nni mu. Megye to mu se nsem biara a wɔbenya afiri me ho no, wɔbetumi de aboada akye nhwehwemu nso.

Menim se eba se mewɔ nsemmisa biara a efa m'akwanya wo nhwehwemu yi mu a, metumi afre Hanna Frimpong, GHS-ERC Administrator wo +233 302 681109, +233 (0) 243235225, 0507041223 anaa UKZN Biomedical Research Ethics Committee, wo 031-260 4769 anaa 031 260 1074 anaa Dr. Sylvester Kyeremeh wo +233209350842/+544172089 anaa Professor Khathutshelo Percy Mashige wo +27824652699 anaa

Nsatim

Eda

Beae

Appendix 8
Ethics training certificate



Zertifikat
Certificat

Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants



Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

syvester kyeremeh

a complété avec succès - has successfully completed

Research Ethics Evaluation

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

December 22, 2014

CID : 96A9E816A

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator



Continuing Education Program
Programmes de formation continue

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[REV : 20140328]

Appendix 9

Ethical approval from BREC



05 May 2015

Dr Sylvester Kyeremeh
P.O. Box BA 362
Bantama-Kumasi
Ghana
kyeremehs@gmail.com

PROTOCOL: The availability and accessibility of low vision services in Ashanti and Brong Ahafo Regions of Ghana: Degree Purposes (MSc) - School of Health Sciences (Optometry). BREC REF: BE438/14.

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 06 October 2014.

The study was provisionally approved pending appropriate responses to queries raised. Your responses received on 23 April 2015 to queries raised on 21 November 2014 have been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given full ethics approval.

This approval is valid for one year from **05 May 2015**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be **RATIFIED** by a full Committee at its meeting taking place on **09 June 2015**.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely



Professor J Tsoka-Gwegweni
Chair: Biomedical Research Ethics Committee

Biomedical Research Ethics Committee
Professor J Tsoka-Gwegweni (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 280 2486 Facsimile: +27 (0) 31 280 4809 Email: brec@ukzn.ac.za

Website: <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>

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Appendix 10
GHS Ethics Approval

GHANA HEALTH SERVICE ETHICAL REVIEW COMMITTEE

*In case of reply the
number and date of this
Letter should be quoted.*



*My Ref. :GHS-ERC: 3
Your Ref. No.*

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: Frimpong@ghsmail.org

Hannah.

29th December, 2014

Dr Sylvester Kyeremeh
P. O. Box BA 362
Bantama-Kumasi
Ashanti Region

ETHICAL APPROVAL - ID NO: GHS-ERC: 09/10/14

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

“The Availability and Accessibility of Low Vision Services in the Ashanti and Brong Ahafo Regions of Ghana”

This approval requires that you inform the Ethical Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethical Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning December 29th 2014 to December 28th 2015.

However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED..........
PROFESSOR MOSES AIKINS
(GHS-ERC VICE-CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

Appendix 11

QUESTIONNAIRE FOR EYE HEALTH PROFESSIONALS

Title: The availability and accessibility of low vision services in Ashanti and Brong Ahafo regions of Ghana

Municipal/District.....

Participant number.....

Date.....

Introduction

My name is Dr. Sylvester Kyeremeh, a master’s student at the University of KwaZulu-Natal, Westville campus. You are being invited to consider participating in a study which aims at assessing how available low vision services are in the Ashanti and Brong Ahafo regions of Ghana and to what extent those services are accessible to patients. This study involves completing this questionnaire which will take between 15 and 20 minutes. Your response will only be used for survey purposes. Thank you for agreeing to complete this questionnaire.

Instructions

There are 8 sections in this questionnaire. The sections are labeled A-J. Each section comprises a set of questions. To respond to the questions, please tick or state briefly as may be appropriate.

A. Demographic information of professional

This section seeks to obtain information on you and your practice. Please tick or briefly state your response as appropriate.

1. Gender: Male Female

2. Age (years)

3. What is your profession?

Ophthalmologist

Optometrist

Ophthalmic nurse

Optician

Orthoptist

Other

Please state.....

4. How many years have you been in the profession?

5. What is the type of your current practice?
Public Private NGO Hospital eye clinic
6. What type of eye care do you mostly offer to your patients?
Primary eye care Specialist care Both
If specialist, please state which specialty
7. Do you intend specialising in or adding low vision care to your service/s?
Yes No
If yes, what is your motivation?
If no, is there any special reason? Please state briefly

B. Information on Low vision

This section seeks to obtain information on your understanding of low vision and patient attendance to your facility. Please tick or state briefly as appropriate.

1. Do you know about low vision? Yes No
2. Briefly state what you think low vision is.
3. Are there any low vision patients presenting to your facility? Yes No
4. How often do you have low vision patients in your facility? Daily Weekly Monthly
Once in a while None
5. On average, how many low vision patients visit your facility in a day?
Please state
6. Do you currently offer any form of low vision service/s? Yes No
NB. If yes, please continue from section C.....If no, continue from I

C. Low vision assessment

This section seeks to obtain information on low vision assessment at your facility. Please tick or state briefly as appropriate.

1. What functional visual assessment do you offer to low vision patients presenting at your facility? (please tick all that apply)

a. Review of patient history and symptoms

History	X
Visual	
Ocular	
Medical	
Social	
Duration	
Other Disability (Physical/Mental)	
Symptoms	
Visual	
Ocular	
Medical	
Social	

b. Assessment of needs/goal setting (*please tick all assessments that you do*)

	X
Needs for distance tasks	
Needs for near tasks	
Needs for mobility	
Needs for daily living skills	
Assessment of current assistive devices	
Assessment support	
Assessment treatment	
Other needs	

Please state other needs assessment that are done in your practice.....

c. Clinical assessment of patient

	X		X
Distance visual acuity using LogMAR chart		Establishing magnification	
Distance visual acuity using Snellen chart		Contrast sensitivity	
Near/reading visual acuity		Assessment of glare function	
Verification of distance prescription		Colour vision	
Verification of near prescription		Visual field assessment if relevant	
Retinoscopy		Assessment of low vision assistive devices	
Distance refraction		Dispensing of low vision assistive devices	
Near refraction		Training in use of assistive devices	
Accommodation if relevant		Advice and referral if necessary	

2. What other visual function tests are performed besides the above-mentioned?

3. Who conducts the low vision examination in your practice? (*Please may tick more than one*)
 Ophthalmologist [] Optometrist [] Orthoptist [] Other [].....

D. Low vision assistive devices (optical)

This section seeks to obtain information on the acquisition, preference and use of optical low vision assistive devices. Please tick or state briefly as appropriate.

1. Which of the following devices are mostly required by patients? (*tick all that apply*)

	X
Hand Magnifiers (Non-illuminated)	
Hand Magnifiers (Illuminated)	
Stand Magnifiers (Non-illuminated)	
Stand Magnifiers (Illuminated)	
Bar Magnifiers	
Flat Field Magnifiers	
Spectacle Magnifiers	
Telescopes	
Clip-on Loupes	

Please state if there are other devices that are required by patients.....

2. Which of the following do you prescribe? (*tick all that apply*)

	X
Hand Magnifiers (Non-illuminated)	
Hand Magnifiers (Illuminated)	
Stand Magnifiers (Non-illuminated)	
Stand Magnifiers (Illuminated)	
Bar Magnifiers	
Flat Field Magnifiers	
Spectacle Magnifiers	
Telescopes	
Clip-on Loupes	

Please state if there are other devices that you prescribe.....

3. Which of the prescribed assistive devices are most preferred by patients?

	X
Hand Magnifiers (Non-illuminated)	
Hand Magnifiers (Illuminated)	
Stand Magnifiers (Non-illuminated)	
Stand Magnifiers (Illuminated)	
Bar Magnifiers	
Flat Field Magnifiers	
Spectacle Magnifiers	
Telescopes	
Clip-on Loupes	

Please state if there are other devices that patients prefer most.....

4. Any possible reasons for this preference?

.....

E. Acquisition and training in the use of devices (optical)

This section seeks to obtain information on the acquisition and training in the use of optical low vision assistive devices. Please tick or state briefly as appropriate.

1. Where do patients acquire the prescribed assistive devices?

Private Optometrist [] Hospital [] NGO [] Other [].....

2. Are the devices easily available for purchase? Yes [] No []

3. If no, how do patients acquire the devices?.....

4. Are patients trained in the use of the devices? Yes [] No []
5. If yes, who does the training?
6. If no, why are they not trained?
.....
7. How much is the cost of service excluding the cost of assistive devices?
8. What is the average cost (in Ghana cedis) of the least expensive assistive device?
9. What is the average cost (in Ghana cedis) of the most expensive assistive device?
10. What is your impression about these costs with regard to affordability?
Expensive [] Average [] Cheap []
11. How do you perceive patients' acceptance and use of prescribed assistive devices?
Very good [] Good [] Poor []

F. Low vision assistive devices (non-optical)

This section seeks to obtain information on the acquisition, preference and use of optical assistive devices. Please tick or state as appropriate.

1. What low vision assistive devices mostly required by patients in your practice?

Non-optical assistive devices	X
Canes	
Out and about assistive devices, taxi, help card	
Mats – coloured rubber, coloured	
Gardening implement set, large handle	
Medicine boxes/bottles, selection	
Newspapers, large print, talking	
Large Print Items, bills, books, diaries etc	
Pens, black, thick felt tip	
Typoscopes	
Bookstand and Clipboards	
Lighting, including task lighting	
Scissors, coloured, large handle Clocks, watches	
Drinking Glasses, mugs – diff. colours	
Cutlery, large handle, selection	
Jar opener, rubber grip	
Liquid Level Indicators	
Chopping boards, selection colours	
Talking items- watch, calendar etc	
Talking Books	
Stickers e.g. large arrow	
Games e.g. cards, dice, large raised dots	

Bump-ons, selection tactile indicators	
Braille sample	
Closed circuit television (CCTV)	

Please state other devices that are required by patients.....

2. What low vision assistive devices do you prescribe?

Non-optical assistive devices	X
Canes	
Out and about assistive devices, taxi, help card	
Mats – coloured rubber, coloured	
Gardening implement set, large handle	
Medicine boxes/bottles, selection	
Newspapers, large print, talking	
Large Print Items, bills, books, diaries etc	
Pens, black, thick felt tip	
Typoscopes	
Bookstand and Clipboards	
Lighting, including task lighting	
Scissors, coloured, large handle Clocks, watches	
Drinking Glasses, mugs – diff. colours	
Cutlery, large handle, selection	
Jar opener, rubber grip	
Liquid Level Indicators	
Chopping boards, selection colours	
Talking items- watch, calendar etc	
Talking Books	
Stickers e.g. large arrow	
Games e.g. cards, dice, large raised dots	
Bump-ons, selection tactile indicators	
Braille sample	
Closed circuit television (CCTV)	

Please state if there are other devices that you prescribe.....

3. What low vision assistive devices are most preferred by patients in your practice?

Non-optical assistive devices	X
Canes	
Out and about assistive devices, taxi, help card	
Mats – coloured rubber, coloured	
Gardening implement set, large handle	
Medicine boxes/bottles, selection	
Newspapers, large print, talking	
Large Print Items, bills, books, diaries etc	
Pens, black, thick felt tip	
Typoscopes	
Bookstand and Clipboards	
Lighting, including task lighting	
Scissors, coloured, large handle Clocks, watches	
Drinking Glasses, mugs – diff. colours	
Cutlery, large handle, selection	
Jar opener, rubber grip	
Liquid Level Indicators	
Chopping boards, selection colours	
Talking items- watch, calendar etc	
Talking Books	
Stickers e.g. large arrow	
Games e.g. cards, dice, large raised dots	
Bump-ons, selection tactile indicators	
Braille sample	
Closed circuit television (CCTV)	

Please state if there are other devices that patients prefer most.....

.....

4. Any possible reasons for this preference?

.....

G. Acquisition and training in the use of devices (Non-optical)

This section seeks to obtain information on the acquisition and training in the use of non-optical low vision assistive devices. Please tick or state briefly as appropriate.

1. Where do patients acquire the prescribed assistive devices?

Private Optometrist [] Hospital [] NGO [] Other [].....

2. Are the devices easily available for purchase? Yes [] No []
3. If no, how do patients acquire the devices?.....
4. Are patients trained in the use of the devices? Yes [] No []
5. If yes, who does the training?
6. If no, why are they not trained?
7. What is the average cost (in Ghana cedis) of the least expensive assistive device?
8. What is the average cost (in Ghana cedis) of the most expensive assistive device?
9. What is your impression about these costs with regard to affordability?
Expensive [] Average [] Cheap []
10. How do you perceive patients' acceptance and use of prescribed assistive devices?
Very good [] Good [] Poor []

H. Multidisciplinary approach

This section seeks to obtain brief information on multidisciplinary approach in low vision care. Please tick or state briefly as appropriate.

1. Do you engage other eye care professionals in your low vision care? Yes [] No []
2. If no, why?
3. If yes, what other eye health professionals do you engage?
 - Ophthalmologists []
 - Optometrists []
 - Ophthalmic Nurses []
 - Orthoptists []
 - Dispensing Opticians []
 - Other [] please state.....
4. Do you engage any of the professionals listed below? Yes [] No []
5. If yes, what other health care professionals do you engage?(tick as many as apply)
 - Care givers []
 - General Practitioners []
 - Occupational Therapists []
 - Rehabilitation Workers/Officer []

- Social Workers
- Voluntary Workers
- Psychologists
- Other.....

6. If no, why?

I. Referral system

This section seeks to obtain information on the referral system for your low vision patients. Please tick or state briefly as appropriate.

1. Is/Are there any referral centre/s for eye care in your district? Yes No
2. If yes, How many are there?.....
3. What type of centre do you have?
Low vision clinic Hospital eye clinic Other
4. Do you refer patients to such centre (s)? Yes No
5. If yes, why?
6. If no, why?
7. How far is the nearest referral centre from your facility?
8. What is the nearest low vision centre to this clinic (if yours is not a low vision clinic)?.....
9. How far is the nearest community from the low vision centre?.....
10. What is the average travel time to the centre?
11. What is the major mode of transport to the centre?.....
12. What is the average cost of transport to the centre?.....
13. What is the nature of the road network?.....
14. Do you receive any feedback from the referral centre concerning your patients?
a. Yes b. No
15. How do you get feedback from the referral centre/s?
16. If not, why?.....

J. Perceived challenges

*To what extent do you agree to the following as challenges to low vision care in your facility?
Please tick where appropriate.*

a. Your facility

		Agree	Disagree	Neutral
1	There is lack of personnel			
2	There is lack of equipment for examining patients			
3	There is lack of low vision assistive devices			
4	Profit from low vision care is low			
5	There are no available referral centres			
6	Patients do not turn up			

Please state briefly if there is any other challenge/s

.....

b. Perceived challenges about patients

		Agree	Disagree	Neutral
1	Patients do not see the need			
2	The cost of low vision assistive devices is high			
3	Assistive devices are not socially acceptable			
4	There is lack of awareness of low vision centre			
5	There are bad roads			
6	There is lack of caretakers			

Please state briefly if there is any other challenge/s

.....

What recommendation/s will you suggest regarding to alleviate the challenges mentioned above?

.....

The end

Thank you very much for filling in the questionnaire

Appendix 12

STRUCTURED INTERVIEW FOR LOW VISION PATIENTS

District/municipal.....

Participant number

City/Town.....

My name is Dr. Sylvester Kyeremeh, a master student at the University of KwaZulu-Natal in South Africa. I thought it would be a good idea to interview you as a participant in a research titled ‘The availability and accessibility of low vision services in the Ashanti and Brong Ahafo regions of Ghana’. The aim of the study is to determine how available and accessible low vision services are in the Ashanti and Brong Ahafo regions. This interview will last for approximately 15minutes.

A. Demographic information about patient

1. Patient gender: Male Female
2. How old are you?
3. What is the level of your education?
4. Are you employed? Yes No
5. If not employed, have you ever been employed? Yes No
6. What was the reason(s) for quitting employment?

B. Available eye clinics

1. How long does it take to get to nearest clinic from your residence?
2. Does the clinic offer eye services? Yes No
3. Have you ever visited the clinic? Yes No
4. Apart from this eye clinic, are there any other clinics available? Yes No
5. What are your impressions regarding services that are offered in this clinic?
.....
.....

C. Low vision assistive devices (optical)

1. Which of the following devices do you use? Can mark more than one option.

	X
Hand Magnifiers (Non-illuminated)	
Hand Magnifiers (Illuminated)	
Stand Magnifiers (Non-illuminated)	
Stand Magnifiers (Illuminated)	

Bar Magnifiers	
Flat Field Magnifiers	
Spectacle Magnifiers	
Telescopes	
Clip-on Loupes	

2. Who/what informed you about the need to use this device/s?

Eye doctor Nurse Other

3. Where do you get your low vision assistive device/s from?

4. How easy/difficult is it to acquire the device/s?

Very easy Easy Difficult Very difficult

5. What are some of the challenges that you face with the acquisition of these device/s?

.....

6. What are some of the challenges that you face with the use of these device/s?

.....

7. What is the average cost (in Ghana cedis) of the device/s you have acquired?.....

8. What is your impression about this cost in terms of affordability?

Expensive Moderate Cheap

9. What recommendations will you give to help make the acquisition of the devices easier?

.....

D. Low vision assistive device/s (non-optical)

1. Which of the following device/s do you use?

Non-optical assistive devices	X
Canes	
Out and about assistive devices, taxi, help card	
Mats – coloured rubber, coloured	

Gardening implement set, large handle	
Medicine boxes/bottles, selection	
Newspapers, large print, talking	
Large Print Items, bills, books, diaries etc	
Pens, black, thick felt tip	
Typoscopes	
Bookstand and Clipboards	
Lighting, including task lighting	
Scissors, coloured, large handle Clocks, watches	
Drinking Glasses, mugs – diff. colours	
Cutlery, large handle, selection	
Jar opener, rubber grip	
Liquid Level Indicators	
Chopping boards, selection colours	
Talking items- watch, calendar etc	
Talking Books	
Stickers e.g. large arrow	
Games e.g. cards, dice, large raised dots	
Bump-ons, selection tactile indicators	
Braille sample	
Closed circuit television (CCTV)	

Other (specify)

2. Who/what informed you about the need to use the device/s?

Eye doctor [] Nurse [] Personal intuition [] Other

3. Where do you get the device/s from?

4. How easy/difficult is it to acquire the device/s?

Very easy [] Easy [] Difficult [] Very difficult []

5. What are some of the challenges that you face with the acquisition of these device/s?

.....
.....
.....

6. What are some of the challenges that you face with the use of these device/s?

.....
.....
.....

7. What is the average cost (in Ghana cedis) of the device/s you have acquired?
8. What is your impression about this cost in terms of affordability?

Expensive [] Moderate [] Cheap []

9. What recommendations will you give to help make the acquisition of the devices easier?

.....

E. Transport

1. What means of transport do you use to reach this clinic? Private car [] Public transport [] Health vehicle []
2. Does anyone accompany you to the clinics? Yes [] No []
3. How often do you visit the clinic?
4. What is the average cost of transport from your residence to this clinic?

F. Referral systems

1. Where and to whom have you been referred to in the past?
 2. How long does it take to travel from your residence to the referral centre?.....
 3. What are challenges you face regarding referrals?
 4. What recommendations will you make concerning the referral system?
-

The end

Thank you very much for participating in this study and for your time.