# AN INVESTIGATION OF AVAILABILITY, ACCESSIBILTY AND AFFORDABILTY OF OPTOMETRIC SERVICES IN THE RURAL MUTALE MUNICIPALITY OF VHEMBE DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA

by

Lufuno Godfrey Thivhafuni

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SUPERVISOR:Prof OA Oduntan

CO-SUPERVISOR: Dr MBL Mpolokeng



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**A research dissertation in partial fulfillment of requirements for Master of Public Health degree in the School of Health Sciences, University of Limpopo, Turfloop Campus, South Africa**


**SUPERVISOR** : **Prof. OA Oduntan,**
**B. Optom (Benin), PhD (City Univ. London),**
**Optometry Department, Faculty of Health Sciences**
**University of KwaZulu Natal**
**SOUTH AFRICA**

**CO-SUPERVISOR** : **Dr. MBL Mpolokeng, MD., MPH (Columbia University, USA)**

**School of Public Health, Faculty of Health Sciences,**
**University of Limpopo (Turfloop Campus)**
**SOUTH AFRICA**

# DECLARATION

I declare that the mini-dissertation hereby submitted to the University of Limpopo, for the degree of Master in Public Health on the **Investigation of availability, accessibility and affordability of optometric services in the rural Mutale municipality of Vhembe district, Limpopo province, South Africa** has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein has been duly acknowledged.

Mr LG Thivhafuni: Date March 2011

Student Number: [redacted]

# DEDICATION

I dedicate this research study to the loving memories of Vhuhwavho and Lufuno Matsila. I wish you are still here with us. I miss you both dearly.

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"I can do all things through Christ who strengthens me". Lord, I thank you for all the strength and good health you granted me through my research. You are forever good to me.

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"Zwo to ralo, munwe na munwe u do la tsha biko lawe. A sa shumi no la a songo la. Ndaa".

# ABSTRACT


**INVESTIGATION OF AVAILABILITY, ACCESSIBILTY AND AFFORDABILTY OF OPTOMETRIC SERVICES IN RURAL MUTALE MUNICIPALITY OF VHEMBE DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA.**

**Background:** One of the responsibilities of the government of South Africa is to make health care services available, accessible and affordable to the people in the country. In the Limpopo province, the department of health is giving priority to eye care through ophthalmology clinics and optometric services. The level of availability, accessibility and affordability of optometric services to the rural communities is unknown.

**Purpose:** The purpose of this study was to investigate availability, accessibility and affordability of optometric services in Mutale municipality, Vhembe District of Limpopo Province in South Africa.

**Methodology:** An exploratory, quantitative and cross sectional, descriptive approach was used. A simple random sample of 55 villages was selected from a total of 124 villages. A population sample of 1000 respondents was included out of total population of 95, 712 people in the rural parts of municipality.
Data was collected using a questionnaire which was translated to Tshivenda. Statistical analysis was done using SPSS and Chi- square test.

**Results:** Respondents were 941 in number yielding a response rate of 94.1% and 508 (54, 5%) were male and 424 (45, 5%) were females. Their ages ranged from 18 to 75 with a mean of 44.2 years and a standard deviation of 13.2.

Optometric services are not readily available in Mutale municipality (60, 3%) have never consulted an optometrist in the municipality and 55,9% of the respondents consulted general practitioners for eye problems. Out of a total of 319, about half (50.2%) reported that they could not consult because optometric services were not available,10.7% respondents could not access an optometrist because they had distance problems. It was found that 86.4% of respondents traveled more than 10km to consult an optometrist and 32.3% could not afford optometric services

**Conclusion:** Long distance travelling to go see an optometrist is proof that the services are not available and are not accessible in Mutale municipality. The low wages of the respondents and their other financial responsibilities prove they cannot afford optometric services. The researcher made recommendations that the department of Health should deploy more optometrist in public medical hospitals and public medical clinics.

# ABBREVIATIONS

Aboriginal and Torres Strait Islander (A&TSI)

Air Mercy Service (AMS)

Local Government Areas (LGAs)

Organization for Economic Cooperation and Development (OECD)

Primary Health Care (PHC)

(Program of All-Inclusive Care for the Elderly) PACE

Rural Mobile Clinic Schemes (RMCs)

## OPERATIONAL DEFINITIONS

**Amblyopia-** A unilateral, or bilateral, decrease of best-corrected visual acuity caused by form vision depravation and/or abnormal binocular interaction, for which there is no pathology of the eye or visual pathway (Kanski, 2003).

**Blindness-** Corrected visual acuity of 20/200 or less in the best eye, or a visual field of not more than 20 degrees in the best eye (Vaughan *et al.*, 1989).

**Cataract-** An opacity of the crystalline lens (Vaughan *et al.*, 1989).

**Glaucoma-** An optic neuropathy with characteristic appearances of the optic disc and specific pattern of visual field defects that is associated frequently but not invariably with raised IOP (Kanski, 2003).

**Keratoconus-** A progressive disorder in which the cornea assumes an irregular conical shape (Kanski, 2003).

**Low vision-** Corrected visual acuity less than 6/18 (20/60) or a visual field less than 30 degrees (Genensky, 1971).

**Managed care-** Any system that manages healthcare delivery with the aim of controlling cost the system relies on a primary care physician who acts as a gatekeep through whom the patient has to go to obtain other health services such as specialty medical care, surgery, or physical therapy ( www.medterms.com/script/main/art.asp?articlekey=4270).

**Optometrist-** A person skilled in testing for defects of vision in order to prescribe corrective glasses. He also refers pathological cases to ophthalmologists for further examination and treatment (Vaughan et al., 1989).

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# Chapter 1
# OVERVIEW OF THE STUDY

## 1.1 Introduction

Health services have traditionally been divided into primary, secondary and tertiary levels and primary care is the first point of contact with the formal health service (Toebes, 1999). Primary care generally includes maternal and child care, prevention and control of locally endemic diseases, immunization against the main infectious diseases and appropriate treatment of common diseases and injuries. Secondary health care is of a more specialized character and includes, for example, radiographic diagnosis, optometric services, general surgery, and care for women with pregnancy or childbirth complications. Tertiary care is generally considered to be the most specialized form of health care services and includes services such as neurosurgery and heart surgery (Toebes, 1999). Secondary and tertiary levels, irrespective of the new dispensation in South Africa are lacking in the rural areas.

The National Health Plan Policy (ANC1994b:4) indicates restructuring of the health system in South Africa, the prerequisites thereof being affordability, accessibility, availability, and equity of services, especially focusing on the disadvantaged groups and communities (Kitchin,1994). It will be of interest to evaluate the availability, accessibility and affordability of health care services, especially in the rural areas of South Africa. The philosophy of Primary Health Care (PHC) has been adopted as a basis for health services in South Africa. Primary Health Care (PHC) in its broader term includes preventative, promotive, curative and rehabilitative care (Denhill *et al.*, 1999). It has been indicated that PHC among other health care services includes the basic optometric services and will be determined by the availability of resources and should be implemented on sustainable basis (Harrison, 1997). The global initiative, Vision 2020: The right to sight, established by the World Health Organisation and the International Agency for Prevention of Blindness, has created valuable and effective collaborations of organisations involved in a wide range of eye care and community

healthcare activities aimed at the elimination of avoidable blindness and impaired vision (WHO, 2000). Vision 2020's major priorities are cataract, trauchoma, onchocerciasis, childhood blindness, and refractive error and low vision (WHO, 2000).These have been selected not only because of the burden of blindness that they represent but also, because of the feasibility and affordability of intervention to prevent and treat those conditions (Holden, 2002).

The most common cause of visual impairment and the second leading cause of treatable blindness, uncorrected refractive errors have severe social and economical effect on individuals and communities, restricting educational and employment opportunities of otherwise healthy people and can account twice as many blind persons per year as compared to cataract, due to the earlier age of onset (Dandona, 2001). Recently, research has indicated that uncorrected refractive error has achieved prominence as a major cause of functional blindness and significantly impaired vision and is easier to treat (Holden, 2002). Worldwide, optometry has been the major provider of vision correction, but usually from a private practice setting. Public health optometry has not reached the communities that are in most need in any organized way (Holden, 2002).

Holden(2002) further indicates that in most developed countries the optometrist to population ratio is approximately 1:10 000. However, in developing countries the ratio is 1:600 000 and much worse in many rural areas, up to millions of people per optometrist. This lack of optometrists is the main reason for the high rates of vision problems due to uncorrected refractive errors in developing countries. In order to deliver good quality eye care to countries where the need is greatest, there needs to be a steady and substantial increase in the number of eye care personnel trained in refraction and vision correction. The current desperate situation in many countries cannot wait for advanced optometry to develop but requires optometry to take a major role in training mid-level personnel in refractive care. Whether it is the world's newest country, East Timor, or Ethiopia with its 70 million people, both without any optometrists; interim measures using nurse-

refractionists or ophthalmic or optometric technicians that refract are essential (Holden et al., 2002).

The need for optometrist is very great for both children and adults. Studies have shown that refractive error in children causes up to 62.5% of blindness (≤ 6/60 in the better eye) (Holden *et al.*, 2002). The burden even reaches the developed countries, with uncorrected refractive error causing 25% of all blindness (< 6/60) in an Australian adult population and 56% of visual impairment (< 6/12) (Holden *et al.,* 2002). The burden of refractive error is set to grow alarmingly due to an increase in myopia in both the developed and developing world, especially in urbanised East Asians, such as the Chinese populations in Hong Kong, Singapore and Taiwan (Lin et al., 2001). In most developed countries, people who undergo eye examination do so, not because they are bothered by a particular eye or vision problem, but because they have been encouraged to maintain an ongoing program of regular preventative eye care (Pieper, 2003). This is not the case in developing countries. The impact of visual loss on the personal, economic, and social life of an individual is profound, and when the prevalence of blindness in communities is high, the consequences become a significant public health issue (West *et a*l., 2001).

A high prevalence of blinding conditions such as cataract, infectious eye diseases and nutritional diseases are present in many developing countries (WHO, 1984). The situation in South Africa is not in any way different. In many of these countries, people living in the rural communities are usually of lower educational and socio-economic status than those living in the urban areas (Oduntan *et al.,* 2001). It is also known that uncorrected refractive errors are responsible for a significant proportion of visual defects in many developing countries especially in Africa and such diseases and refractive conditions can be treated before they result in disabling or blinding conditions (Scwab *et al.*, 1983). Unfortunately, for various reasons, many individuals in the developing countries, especially those living in the rural communities do not have access to eye care services.

Four countries in Africa have optometric teaching institutes: South Africa, Nigeria, Tanzania, and Ghana. Most of these programs are struggling in difficult economic and/or political environments. The difficulties facing these programs are likely to remain, but the recent dramatic developments in communication and cooperation between these four countries will be a positive force towards seriously addressing the need for more optometric practitioners throughout the African continent (Penisten, 1993). Within the first ten years of Optometry in the University of Limpopo in South Africa, student population ranged from two to twenty one. Students from other Southern African countries were admitted into the program as early as 1977 (Oduntan, 2006). The author further indicated that during the second decade, enrolment increased tremendously and this may be attributed to greater awareness of optometry as a professional option at local, national and international levels.

The political set up of South Africa prior to 1994 in which one race was considered to be superior to another made it difficult for the vast majority to access proper eye care and other essential medical treatments which are still carrying on even today. McGregor (1994) indicates that there is no doubt that the gross inequalities of the apartheid era led to vision care becoming more and more the privilege of the more affluent, inaccessible and unaffordable to the vast majority of South Africans. Access to health care services including optometric services in South Africa, as with many other fundamental necessities, has historically been skewed in terms of race, gender, socio-economic status, sexual orientation, disability and a number of other arbitrary grounds. Systems, structures and institutions established to deliver health care services have historically reflected - and continue to reflect - a disproportionate bias in favour of dominant groupings in South African society (www.doh.gov.za).

For millions of rural communities of South Africa, professional eye care is not an option. The most they can hope for is treatment by nurses at medical day care clinics, and only for some form of eye injuries. (Hutchison, 1995). This means that in most rural areas of this country, optometric services are not readily available. Poverty has effects on many

aspects of life including health. It leads to poor nutrition and the latter leads to poor health. In poverty ridden communities, vitamin A deficiency results in xerophthalmia which may lead to low vision and blindness (Oduntan, 2005). A great number of black South Africans live in rural areas where most of them work on farms. The majority of rural Mutale municipality residents earn very little amount of money in farms and in tourism developments where they work. (www.mutale.gov.za/docs/Final%20IDP%202006%20-%2007.doc). Even though health care services are highly needed in the rural areas, most health care professionals (including optometrists) in South Africa are not willing to practice in the rural areas; instead they crowd up in the urban areas where the majority of inhabitants are economically better than those living in the rural areas (Oduntan *et al.*, 2001). Eye care services are, therefore, usually concentrated in urban areas and are usually lacking in rural communities due to scarcity of resources, trained personnel and poor accessibility (Herse, 1991).

## 1.2 Research problem

It is not certain whether eye care services are available, accessible and affordable in the Mutale municipality. This is why this study is being carried in this municipality.

## 1.3 Aim of the study

The aim of this study is to investigate availability, accessibility and affordability of optometric services in the Mutale municipality of Vhembe district, Limpopo, South Africa.

## 1.4 Objectives of the study

- To establish availability of optometric services in Mutale municipality.

- To identify if the people in the Mutale municipality of Vhembe district have easy access to optometric services.
- To identify if the people are able to afford optometric services

## 1.5 Research questions

The proposed study will seek answers for the following questions:

- Are optometric services available in the Mutale municipality of Vhembe district, Limpopo Province of SouthAfrica?
- What optometric services are accessible, if they are available in the Mutale municipality?
- How affordable are the optometric services to the people of Mutale municipality?

## 1.6 Hypothesis

There is poor availability, accessibility and affordability of optometric services in Mutale municipality, Vhembe District, Limpopo Province, South Africa.

## 1.7 Motivation

The researcher as a private optometric practitioner has over the years seen many patients who traveled from Mutale municipality to his practice located at Thulamela municipality of Vhembe district in Limpopo of South Africa. He wonders why these patients had to travel such a long distance from another municipality for eye care services. The distance between Tshilamba, which is the busiest town in Mutale municipality is 35 km north east of Thohoyandou (where the researcher's practice is located) and people pay a taxi fair of R20 to and fro.

Also, he has an idea of the poor economic status of rural residents of the Vhembe District. He therefore, wishes to examine the availability, accessibility and affordability of eye care services in the Mutale Municipality.

## Chapter 2

# Literature review

## 2.1 Introduction

In the year 1999 the World Health Organisation (WHO) and the International Agency for the Prevention of Blindness launched a global initiative for the elimination of avoidable blindness with the theme: Vision 2020: The Right to Sight." This worldwide initiative aims at eliminating avoidable blindness by the year 2020, in order to give all people in the world the right to sight. The primary goal of the initiative is elimination of avoidable blindness due to five diseases or conditions: cataract, trachoma, onchocerciasis, Vitamin A deficiency and refractive errors (Sacharowitz, 2005). Vision 2020 was launched in English speaking Africa in April 2000 (WHO, 2000). South Africa, as part of this program offered its full support in terms of public health and political commitment (Sacharowitz, 2005).

A study conducted in Limpopo in 1998 reported a 5.7% prevalence of blindness in which the main causes were age related cataract (59%) and chronic glaucoma (22.9%) while the main causes of visual impairment were age related cataract (75.3%), refractive error (10%) and chronic glaucoma (4.7%) (Sacharowitz, 2005). Although this study was province specific, there appears to be a correlation with national data (Sacharowitz, 2005). There are many ocular disorders which can be treated, prevented, limited from progression and some social imbalances such as poor self esteem if proper eye care is not provided. Such diseases include among others glaucoma, keratoconus, blindness, ocular manifestation of systemic diseases and amblyopia (Oduntan *et al.*, 2001).

From the experience of the researcher, the eye care services in Vhembe district are not adequate. Major hospitals in the Province such as Elim, Tshilidzini, Siloam and Donald Frazer have optometric services but the equipment is inadequate and in most cases need maintenance or replacement. Mutale medical centre and government clinics within the district do not have the necessary optometric equipment. Optometrists and

ophthalmic nurses are very few and the only two ophthalmologists in the district are located at Elim hospital, Makhado Municipality. The present state of health care service delivery, particularly optometric services in many rural areas is disappointing though there are very good policies in place. The poor state of health care services can be attributed to the fact that there are a few hospital posts, and the financial remuneration for the health workers is relatively poor compared to the private sector (www.edoc.co.za/modules.php).

## *2.2 Availability of eye care services*

In many rural areas of the world, health care services are usually scarce, therefore conditions which could have been treated at early stage are not attend to, hence may result in low vision and blindness (Oduntan, 2005). Millions of people need eyeglasses and do not have them. Assuming that the average pair of eye glasses has an effective life span of two to five years, an additional 60 to 150 million spectacles would be needed each year for the estimated 303 million individuals who currently need correction and optometrists are engaged in a variety of capacities in an attempt to address the significant public health problem of uncorrected refractive error (Vincent et al., 2007).

Even in many developed countries, Ophthalmologic services are not enough (Stevens *et al.*, 2000). The situation in the developing countries would be expected to be very poor. In many developed countries, optometric manpower is adequate. In Indiana, USA, optometrist capacity has been reported to be sufficient at both the state and county levels, and optometric services are approximately distributed such that patient access to optometric care is geographically unburdened (Marshall, 2000). In some states of the USA, availability of optometric services is not a problem. In Massachusetts of USA, workforce projections suggest an excess supply of optometrists is likely over next 20 years and approximately 550 optometrists are expected to retire each year, while more than 1100 optometrists enter practice annually. (White et *al.*, 2000). The profession of optometry in Australia is undergoing considerable change and in 2005, the

number of optometrists was adequate for the needs of the population in the cities (Horton *et al.*, 2006). This was confirmed by a study done by Kiely (2007) indicating that in Australia Optometrists are concentrated in areas of high population with capital city regions and their surrounds well-serviced but with rural and remote local government areas (LGAs) with low populations generally not having optometrists. The highest excesses of optometrists occur in the capital city LGAs of Melbourne, Sydney and Adelaide (Kiely *et al.*, 2007). The author further indicated that many rural LGAs are in need of a fraction of a full-time optometrist to meet the needs of the local population. Eye care in Papua New Guinea had been available only from three Government eye surgeons, who were overworked and located in the major centers, or one private ophthalmologist and two private optometrists who catered mainly for the few expatriates and the small number of wealthy national people (Farmer,2000).

In the developing countries, eye care services are not readily available in the rural communities, the residents often resort to local palliatives rather than undertake the tortuous journey entailed in seeking an optometric service in the urban areas (Onyelucheya, 1993). There are 52 countries in Africa with a total population of about 500 million people and the total number of optometrists is less than 5000 as at 1996 (Sheni, 1996). Thus the optometrists: population ratio in some countries is 1:1 million patients (Sheni, 1996). These indicate that there is a great need for optometrists in Africa. The author further indicates that some countries have no or only one optometrist whereas Nigeria and South Africa share more than half of the total number of optometrists in Africa. For the vast majority of people in Africa, eye care services are not available. Optometrists have long been practicing in parts of Africa, but optometric teaching institutes have only recently appeared in several African nations (Penisten, 1993). The state of eye care in Africa stands in alarming contrast to that in the rest of the world. Poor practitioner-to-patient ratios, absence of eye-care personnel, inadequate facilities, poor state funding and a lack of educational programs are the hallmarks of eye care in Africa, with preventable and treatable conditions being the leading cause of blindness (Naidoo, 2007). Demands for eye care services far outweigh the available resources in Africa, not only in terms of funding and facilities for cataract surgery, but

also for correction of refractive errors and low vision rehabilitation (Mburu et al., 1983). Uncorrected refractive errors are a significant cause of avoidable visual disability and the lack of awareness and recognition of this correctable cause of visual disability, compounded by the non- availability of affordable testing and the provision of corrective lenses contributes in blindness and visual impairment in Africa including rural South Africa ( Sacharowitz, 2005).

In South Africa, optometric services are provided mainly by private practitioners. Disproportionate distribution of optometry services in the rural areas as is currently the case in South Africa and many parts of the developing world does not offer equal eyecare opportunity for patients (Oduntan *et al.,* 2007). However, there are non-governmental organizations such as Air Mercy Service (AMS) and Phelophepa that provide optometric services as well (Cullinan, 2006). In trying to address the availability, accessibility and affordability of optometric services in South Africa, the Transnet Foundation's Phelophepa started on 10 January 1994 as the first and the only primary health care train in the world, operating as a health and educational facilitator reaching thousands of rural communities in South Africa (www.phelophepa.co.za). The schedule/route of Phelophepa for 2006 in Limpopo was: Lephalale, Musina, Makhado, Polokwane, Tzaneen and Acornhoek (www.phelophepa.co.za). The train does not cover the area being investigated in this study.

Air Mercy Services (AMS) transport doctors and other health professionals to rural hospitals in both Kwazulu-Natal and the Western Cape a couple of times a week. The professionals (including optometrists), either in private practice or working at urban government hospitals, offer their services free of charge to communities where specialists are rare (Cullinan, 2006). The service most in demand is optometry, and over 85 000 patients have been helped at the eye clinics facilitated by AMS since the service started (Cullinan, 2006). One of the greatest problems in South Africa is that the previous health policies did not include optometric posts in state or district hospitals (Sacharowitz, 2005). This created a problem of non-availability of optometric services to the majority of the people especially those in rural communities. The South African

Optometry Association have recognized the role that optometrist could play to alleviate visual impairment through correction of refractive errors with an intention of bringing eye care to the uninsured, the unemployed and the economically compromised (Sacharowitz, 2005). The author further indicated that the indicative figures showed 1 806 000 refractive impairments and an additional presbyopic population of 8 600 000 making a total of 10 406 000 in need of refractive correction.

As at 2003, there were less than five ophthalmologists in the Limpopo Province, giving ophthalmology: population ratio of 1:82,000 (Oduntan et al, 2003). The Department of Health in Limpopo Province is giving priority to eye care. In addition to ophthalmologic clinics, the department has optometric services in many of the provincial hospitals in which they engage mostly in refraction (Odutan *et al.*, 2001). The Limpopo department of health had the privilege of employing optometrist in government as early as 1991 and currently has thirty Optometrists in various hospitals in the province (Sacharowitz, 2005). As an attempt to make optometric services available, several optometry students are given scholarship yearly in order to attract them to government services following completion of their studies (Odutan *et al.*, 2001). The department of optometry, University of Limpopo, Turfloop campus also offers comprehensive optometric services to the nearby communities. It has a mini bus which is used to convey students to community (Provincial) rural clinics, and transport patients from their communities to the optometric clinic on campus (Oduntan, 2006). Mankweng hospital which is situated 500 meters from the University mainly engages in both secondary and primary health care because of its rural location and has both ophthalmological and optometric services. (Odutan *et al.*, 2001) Again, Vhembe district is not covered by this outreach. The eye care services that are available in the rural communities of South Africa are often under-utilized due to poor economic status, lack of transportation, level of literacy, lack of awareness and traditional beliefs (Oduntan *et al.*, 2001).

## *2.3 Accessibility of eye care services*

It is common knowledge that eye care services like other health care services are not easily accessible especially in the rural areas of the world. According to Di Stefano

(2002), there is a problem of low optometric practitioner-to- population ratio world-wide which is even worse in the rural areas. This obviously will result in poor accessibility. Di Stefano (2002), also states that the lack of accessible eye and vision care globally is a critical component to the successful elimination of avoidable blindness. People need access to preventative services that are effective in prevention of disease or in detection of asymptomatic diseases or risk factors at early, treatable stage (Bowyer *et al.*, 2000). In developing countries such as Jamaica, access to eye care services is severely inadequate. Outdated optometric laws governing the activities of eye care professionals compounds the problem (Buchanan *et al.*, 2000).

The issue of accessibility in the developed countries is however, better than in the developing ones. In New York (USA), optometrists are equitably distributed geographically and are more likely to have weekend and evening office hours, thus enabling increased patient access to eye care (Soroka, 1991). Gold *et al.*, 1999 has reported that although poor access to general medical care services has been documented widely, the unmet need for supplemental health care services such as eye glasses has been largely ignored. He further indicates that more than 5% of the USA population reported unmet need for eye glasses. Differential access to health care corresponding to differences in socioeconomic status is well documented in urban public housing communities in Los Angeles County, California. Low socioeconomic status has been consistently associated with decreased access to care and poorer outcomes. This study is notable in demonstrating that factors related to access to care are influential determinants of timely utilization of eye care services even within a community that is uniformly socioeconomically disadvantaged
(Baker *et al.*, 2005).

In Australian metropolitan areas, people may live close to an optometric practice in neighbouring local government areas (LGA). In rural areas, LGA may appear to have an adequate number of optometrists but some residents may be several hours from the nearest optometrist or the optometric service is provided on a part-time basis (Kiely et al., 2007). The author further indicated that people resident in most LGAs in Victoria and

Tasmania were within a distance of 100 kilometers from an optometrist. In the other states, there was often good access to optometric care in the coastal LGAs but access decreased further inland towards LGAs of low population. There were LGAs in Australia where people did not have easy access to optometric care but this was most often because of the remoteness of the LGA and a low population that was too small to sustain even a part-time optometrist. Australian Government has recognized that Australians living in rural and remote areas face particular difficulties in gaining access to quality health and aged care and most areas of rural Australia have experienced shortages of GPs (general medical practitioners), specialists and other health professionals, as well as limited access to health services because of a tendency for medical graduates to stay in the cities, rather than practice in the country. (http://www.health.gov.au/internet/wcms/publishing.nsf/Content/factsheet-rural_health.htm )

Limited accessibility to health services, poor hygiene, low standard of living conditions have been considered as some of the factors leading to the prevalence of blindness being ten to forty times high in developing countries than in industrialized countries (Tabbara, 1986) . Thousands of residents in southern India have easy access to eye care services as a result of a specially designed, low-cost and long-distance wireless network. The network allows specialists at Aravin Eye Hospital at Theni, in the state of Tami Nadu, to interview and examine patients in nine remote clinics via high-quality video conference (Jimenez, 2007). The author further indicates that 2500 patients are able to receive eye care services through this network each month and that the network is being expanded to include 50 more clinics which in total will serve more than half a million patients each year in rural South India, most of whom have no access to eye care today.

Disproportionate distribution of optometrist in South Africa is undesirable as everybody must have equal access to eye care irrespective of their economic status (Oduntan *et al.,* 2007). The author also indicated that there are provinces in South Africa such as

Northern and Western Cape where there are no optometric posts in the public sector. In South Africa, Optometric services are not easily accessible in rural areas. Eye care services are usually lacking in the rural communities due to scarcity of resources, trained personnel and poor accessibility. Chabedi (2005) indicates that the importance of giving people an opportunity to have access to eye care cannot be underestimated and is the reason why the South African Optometrist Association has organized Right to Sight Days each year. Although South Africa is better than the rest of Africa with regard to optometrists, the distribution has resulted in most of the population finding it difficult to access these services (Ferreira, 1991). More than 100 tours are taken by Bureau for the Prevention of Blindness to provide eye care services to rural areas and townships of South Africa which lack access to adequate facilities in which close to a million people have been screened since 1944 and over 100 000 spectacles had been dispensed (Cook et al.,1995). The Optometry Department of the University of Limpopo, Turfloop branch together with Mankweng hospital offer accessible optometric and ophthalmological services to the communities around Mankweng. The university and the hospital also engage in a joint community service in which eye care services are delivered to selected rural communities through twelve community clinics which are visited twice a month (Oduntan *et al.*, 2001). Services are rendered by students from the university accompanied by staff members and ophthalmic nurses from the hospital. These communities are able to access optometric services with ease (Oduntan *et al.*, 2001). Again Vhembe district is not catered for in this endevour.

It is difficult to reach some rural areas of South Africa because of the poor condition of the roads (Cochrane, 1995). Outreach to the most rural areas is difficult but with four wheels drive vehicles and motorbikes it is most certainly possible (Cochrane, 1995). This is one of the factors which may contribute to the poor accessibility in the rural Vhembe district. As phelophepa health care train visits many rural South African villages, it has increased accessibility of health care. Unfortunately, the train does not reach the Mutale municipality since there are no rails for the train to get there. The bill of rights in the constitution of South Africa 27(1), however, indicates that everyone has the

right to have access to health care services (Act 108, 1996). Therefore, the issue of accessibility needs to be given due attention country wide.

## 2.4 Affordability of eye care services

Affordability of Health care services is a worldwide issue. In many rural areas of the world, people are poor, therefore are not able to afford the cost of eye care services. Consequently, conditions which could have been treated at early stage are not attend to, hence may result in low vision and blindness (Oduntan, 2005). According to Owsley *et al.,* 2006, the barrier to eye care problem most frequently cited by both African-Americans and eye care providers was transportation and the cost of eye care in Alabama of the USA. In Canada, optometrists are primary providers of low vision services, including dispensing of low vision aids, but such devices are expensive, and cost associated with providing low vision assessments and services are higher than compensation to vision service providers (Gold *et al.,* 2006). Gold *et al.*, 2006 again indicates that more than 80% of the 5% of the USA population cited financial reasons as the primary barrier to accessing eye glasses and persons with poor health and blacks were most likely to face these barriers.

In Australia, some patients in the Victorian state of Australia had never had their eyes tested due to costs. Some services had private optometrists conduct eye clinics on site; however they felt that some residents did not follow up with commercially priced glasses prescribed, due to cost (www.bsl.org.au). Most consumers and service providers indicated that price of eyewear was a significant barrier and cost was a major deterrent to having regular eye examinations in Victorian state. In Fiji, males and females continuously receive eye care from the Province's hospital eye clinic with the best equipped and staffed facility offering ongoing eye care indicated that their problems are more related to cost than distance, since a larger proportion of rural respondents perceived use of the hospital eye clinic as not being affordable (du Toit *et al.,* 2006). Before 1994 eye care services were only afforded by the expatriates and a small number of wealthy national people in Papua New Guinea. A nurse training course was

introduced in which nurses were trained in eye care and supply of low cost spectacles (Farmer, 2000).

In many parts of Africa, affordability of health care services is poor. Naidoo *et al* (2006) reported that affordability of eye care services in Haydom Lutheran Hospital of Mbulu district in Tanzania needs to be considered within a broader context than the cost of the spectacle. The total cost to the patient must be examined, which would include transport cost, often for an escort too; loss of productivity at the homestead; loss of income for the escort. The author therefore indicated that the cost of spectacles is not the major factor in determining affordability. Even a free pair of spectacles could prove to be unaffordable, if the patient has to return to the clinic many times in order to collect it. Ethiopia, with a population of over 65 million and 44% of the population living below the poverty line (Melese *et al.,* 2004). The prevalence of blindness and visual impairment are high and the use of services is limited and the main barrier for seeking eye care service is related to the indirect costs of the service. This suggests that efforts are needed to create mechanisms that 'bridge' communities and eye care facilities (Melese *et al.,* 2004).

A great number of people living in South African rural areas are poor and many of them are illiterate. Therefore, even when eye care services are available, they are often under-utilized due to poor economic status, lack of transportation, low level of education, lack of awareness and traditional beliefs (Onyelucheya, 1993). Optometric benefits have been reduced significantly by most medical aids schemes in South Africa (Olls, 2006). Therefore, patients are unable to pay the balance of their eye care services and this contributes to non-affordability of the services. Also, because of the high rate of unemployment, especially in the rural towns and villages, people do not have money for eye care services.

Although South Africa is better than the rest of Africa with regard to optometrists, the poor distribution has resulted in most of the population finding it difficult to afford these services (Ferreire, 1991). Clearvision Optometrists was founded by a group of

independent Optometrists with the primary aim to provide cost effective eye care solutions and improved product and service delivery to all citizens of South Africa (www.clearvision.co.za/general/general.asp). Department of Optometry of the University of Limpopo and Mankweng hospital render affordable eye care services to selected rural communities around the university and the Mankweng hospital. The services rendered include refraction, diagnosis of ocular diseases and provision of low cost spectacles (Oduntan et *al.*, 2001). Low cost spectacles are provided by the optometric department, while drugs are provided for certain ocular diseases by the ophthalmic nurses from the hospital at no cost. Vhembe district is not catered for by this initiative.

The fact that South Africa is a developing country with many rural settlements comprised of residence who are either unemployed or working in farms earning less money has prompted the researcher to conduct this research on availability, accessibility and affordability of optometric services in Mutale municipality.

# Chapter 3

# Material and Method

## 3.1. INTRODUCTION

In this chapter the research methodology and techniques that were used in the study are discussed in detail. The study design, the population and sample are described. The instrument used to collect data including methods implemented to maintain validity and reliability of the instrument are described.

## 3.2 Study site

The study site was the rural areas of Mutale municipality of Vhembe district, Limpopo province which is situated north east of Limpopo. It borders Zimbambwe in the north and Mozambique in the east through Kruger National Park. It is 35 km north east of Thohoyandou.

(www.mutale.gov. za/docs /Final %20IDP%202006%20-%2007.doc). Most areas of the villages are not easily accessible by modern vehicles because of the conditions of the roads. (Dzebu, 2005 ).

Mutale municipality covers 2345, 8750 square kilometers and consists of 124 villages which were traditionally neglected and need considerable investment in terms of infrastructure. The municipality is comprised of two towns, Mutale and Masisi and the 124 villages are spread over seven tribal authorities. It consists of 11 wards and a population of 95712 inhabitants and has a large number of youth some of whom are at school and most of the others are unemployed and illiterate (www.mutale.gov.za/docs/Final%20IDP% 20 2006%20-%2007.doc). The researcher chose to do a study in this municipality because it is rural and far from urban areas.

## 3.3 Study design

The design of this study was exploratory in nature and a quantitative, cross-sectional and descriptive approach was used.

Exploratory research is conducted when little is known about the phenomenon that is being studied (Brink, 1996). A quantitative study is a formal, objective systematic process to describe and test relationships and examine cause and effect interactions among variables (Burns and Groove 1993). In this study a quantitative approach was followed through a cross sectional method. Cross sectional study collect data from population of interest at one point in time (Bowling 2002). In this study the researcher came into contact with respondents only once when collecting data. The purpose of descriptive studies is to observe, describe, and explore aspects of a situation (Polit et al., 1993).

## 3.4 Population

Mutale municipality consists of a population of approximately 95, 712 inhabitants. The population is distributed into 17 818 households in 124 villages. The target population in this study consists of all adults 18 years and older residing in the 124 villages.

Neuman (2000) defines population as the large group of many cases from which the researcher draws a sample. According to Burns and Groove (1993) a population is defined as all elements (individuals, objectives and events) that meet the sample criteria for inclusion in a study.

## 3.5 Sample and sample technique

Since the purpose of this study was to estimate the proportions of adults who were aware of availability, accessibility and affordability of optometric services in the municipality, and there was no intent to compare the estimates to any pre-existing standards by means of testing hypothesis, the sample size was determined by using the

monitoring and evaluation framework (Adamchak et al., 2000). Using this framework, the required sample size was 925.

The sample size was determined to achieve a 90% power and 5% significance level, using the following equation recommended by Adamchak et al (2000):

$$n = \frac{D\left[z_\alpha \sqrt{(2p(1-p))} + z_\beta \sqrt{(p_1(1-p_1) + p_2(1-p_2))}\right]^{1/2}}{(p_2 - p_1)^2}$$

A targeted detectable change ($p_2$ - $p_1$) of 10 percentage points was adopted for the requirements of calculating the sample size.

In order to detect this change at 95% level of significance and 90% power and applying a Design Effect correction factor (D) of 2, a sample size of 841 was required.

This was the sample size if sampling from an infinitely large population. Applying a finite population correction (with the population size of 17818 households), the sample size was $n$ = 803.

This number was increased by 10% to cover for non-response, bringing the sample size to 883. The study population will be 1000 sample. This number was greater than the calculated minimum sample of 883.

This assumption was based on half of the population being adult. Due consideration given to gender representation. One questionnaire was given to an adult in one household irrespective of how many family members are there.

A simple random sample of villages was selected from the N = 124 villages in the Mutale Municipality to estimate proportions of the population that was included in the study. It was assumed that estimates were made with 90% confidence and a margin of error of 5 percentage points. It was further estimated that the level of awareness was not more than 30%. With these assumptions, the sample size required was $n$ = 55 villages.

Villages were put into three groups. Group A had approximately the smallest number of households, one-third of villages (with less than 90 households), Group B had approximately the middle one-third (with between 90 and 139 households) and Group C had villages with 150 or more households. The sample size of 55 was distributed according to the number of villages in each group. Thus, 20 villages were sampled from group A, 17 from group B and 18 from Group C. The total number of villages selected was 55.

The number of households per selected village was determined by dividing 116 for Group A over the 20 villages, 251 for Group B over the 17 villages and 633 for Group C over the 18 villages. After rounding up and re-adjusting, the final number of households per village and total number of households for each group were calculated as in **Appendix B** and the overall sample size of respondents was 1005. This population sample size was large enough to represent the population being sampled.

## 3.6 Method of recruitment

Systemic random sampling was used as a method of recruitment of study population in each village based on the number of household in each village. The following formula was used in the calculation of each village sample population:

$$\text{Each Village population} = \frac{\text{No of households x Total study population}}{\text{Total number of households}}$$

## 3.7 Inclusion and exclusion criteria

The study included both male and female participants residing in the 55 villages. Respondents included those with and those without spectacles. The study excluded people below the age of 18 and the residents of the remaining 69 villages out of the total of 124 villages. The study also excluded people who were visiting the target villages on the days of data collection.

## 3.8 Data collection

Data was collected within a period of three weeks through a self administered questionnaire in the 55 selected villages. A questionnaire (**Appendix A1**) translated to Tshivenda (**Appendix A2**) was distributed to the participants for completion. The participants who were invited to complete the questionnaire were told about the purpose of the study so they can know why the survey was being conducted. After the explanation, participants were asked if they still want to participate in the study. A written consent was obtained from all who agreed to participate in the study. Subjects who could read and write were given the questionnaire to complete. Those who could not read or write were assisted by the researcher to complete the questionnaire.

### 3.8.1 Research instrument

A questionnaire was used in order to get information from all participants. A questionnaire is a printed self report form designed to elicit information that can be obtained through the written responses of the subjects. The information obtained through a questionnaire is similar to that obtained by an interview, but the questions tend to have less depth (Burns and Grove 1997).

The reason for using a questionnaire was that it ensures a high response rate when participants complete it, and it requires less time and energy to administer. A questionnaire has less opportunity for bias because it is presented in a consistent manner. Given the fact that a statistician was used during the development and analysis of the questionnaire, it became quicker and cheaper to analyze.

Although there are advantages indicated above, questionnaires also have their weaknesses. The subjects might not reflect their true opinions but might answer what they think will please the researcher, and valuable information may be lost as answers are usually brief (Burns and Grove 1997).

The questionnaire consisted of sections on availability, accessibility and affordability of optometric services. The questionnaire also addressed issues on socio demographic

information such as age, gender, level of education and income. This information could assist the researcher when interpreting the results, for example, if services are available why are people not utilizing them?

The rest of the questionnaire obtained information on availability, accessibility and affordability of optometric services in Mutale municipality. Instruction guidelines were attached to the questionnaires to guide the respondents as to whether to circle or tick the chosen response.

The questionnaires were in English and Tshivenda to enable those who do not understand English to complete them in Tshivenda. As many as 77% of the respondents were comfortable with English questionnaires. Only 11% of respondents could not read or write whereas 12% respondents had primary education and completed the questionnaires in Tshivenda. The researcher assisted those who could not read or write. They were also given assurance that the answers would not be able to link their responses to them at the stage of data analysis, therefore ensuring anonymity.

### 3.8.2 Instrument Validity

In every study, the validity of research findings is of great importance. Validity is an assessment of whether the instrument measures what it aims to measure. The judgment that an instrument is measuring what it is supposed to measure is primarily based upon the logical link between the questions and the objective of the study (Bowling 2005).

According to Bowling (2005), content validity refers to judgments about the extent to which the content of the instrument appears logically to examine and comprehensively include, in a balanced way, the full scope of the characteristic or domain it is to measure. To achieve content validity, questionnaires included a variety of questions on availability, accessibility and affordability of optometric services. Content validity was further ensured by consistency in administering the questionnaires. All questionnaires were distributed to respondents by the researcher and his research assistants. Respondents were instructed to complete all questions and the researcher assisted with the completion of those

questionnaires for those respondents who could not read and write. All the respondents completed the questionnaire in the presence of the researcher.

External validity refers to the generalisability of the research findings to the wider population of interest (Bowling 2005). All the people approached to participate in the study agreed to complete the questionnaires. Generalizing the findings to all members of the population is therefore justified.

### 3.8.3 Reliability of instrument

Reliability is the consistency and dependability of a research instrument to measure a variable (Brink, 1996). A scale or test is reliable to the extent that repeat measurements made under constant condition will give the same results. The questionnaire which was answered by respondents revealed consistency in responses. Reliability was also ensured by minimizing sources of measurement error like data collector bias. Data collector bias minimized by the researcher's being the only one to administer the questionnaires and standardizing conditions such as exhibiting similar personal attributes to all respondents e.g. friendliness and support.

## 3.9 Pilot study

Prior to the main study, a pilot study was conducted in one of the villages of Thulamela Municipality in the Vhembe district. Fifty respondents were involved in the pilot study. Out of all the participants, 98% of them responded that optometric services are available and this is sported by the fact that Thulamela municipality has more than 12 optometrists in the private sector and a few more in public hospitals .Many (72%) reported that optometric services are accessible and 28% was not able to access them due to distance from public hospitals which offer optometric services and far from towns where there are optometrists. Of the 50 participants, 54,6% could afford optometric services because they had medical aids and others were earning more than R20,000 per months and the remaining 45,4% could not afford due to poverty related reasons.

## 3.10 Objectivity of the study

The research methodology was considered to be objective because of the methodology employed for sampling (see above).

## 3.11 Data analysis and result presentation

All statistical analysis was done using the Statistical Product Service Solution (SPSS). Descriptive statistics such as frequency, percentages, tables, graphs and Chi-Square test of association was utilized to analyze data. The Chi square test was used to analyze data. As questionnaires were returned, routine checks were made for missing data so that they could be obtained and entered where possible (Bowling, 2005). The researcher consulted with a statistician for data analysis and interpretation. Results were presented in the form of range, mean, standard deviation, tables and graphs.

## 3.12 Dissemination of research findings

Dissemination of the information generated from the study will be in the following forms:

- Presentation at local, national and international conferences.
- Publication in SAPSE peer review journals

## 3.13 Logistic Regression.

Logistic regression was used to model their reasons against demographic variables in the data. The variables are:

A1: Age (years) last birthday

A2: Gender of household head (Categorical: Male or Female)

A3: Household Size

A3_1: Number of household members over 76 years

A3_2: Number of household members 16 -75 years

A3_3: Number of household members 6 - 15 years

A3_4: Number of household members 5 years and below

A4.1: Employment Status of household head (Categorical: Employed or Unemployed)

A5: Monthly Income of Household (Categorical: Four income bands: Up to

R1200.00, R1201.00 to R3000.00, and R3001.00 to R5000, Over R5000.00)

The coding system for the variables in the logistic regression analysis is shown in **Appendix G.**

## 3.14 Summary

The design of this study was exploratory in nature and a quantitative, cross-sectional and descriptive approach was used. Questionnaires were administered by the researcher himself to collect the data from a population sample of 1000. The questionnaire had both closed and open-ended questions. Permission was obtained from the chiefs of the villages in which the research was conducted. Anonymity and confidentiality were ensured during administration of questionnaires and report writing. This chapter described the research methodology, including the population, sample, data collection instruments as well as strategies used to ensure the ethical standards reliability and validity of the study.

# Chapter 4

## RESULTS

### 4.1 Introduction

This chapter presents the results of data collected and findings are presented in narrative forms, tables and Figures. Results are presented as follows: 4.2 Socio-economic profiles of respondents; 4.3 The need for eye care services among the respondents; 4.4 Utilization of results of availability, accessibility and affordability of eye care services; 4.5 Availability, accessibility and affordability of eye care services Logistic regressions analysis of availability, accessibility and affordability of eye care services; logistic regression model 1: availability, logistic regression; model 2: accessibility, and logistic regression model 3: affordability. Also, the characteristics of participants who have consulted for eye problems are presented; logistic regression model 4: ability to pay for spectacles are presented and finally, results on the utilization of eye care services by the residents of the Mutale Municipality.

The research was done in a rural municipality with 17 medical clinics, 3 mobile clinics and 1 health centre servicing 124 villages. This municipality had only 1 emergency service situated in Tshilamba which is the only township and is the business hub of the municipality. Medical hospitals are situated in Thulamela municipality with Donald Fraser hospital being the nearest, at 25 km South East of this municipality. Mutale municipality roads infrastructure is being improved with major routes to economic and tourist attraction areas as priority. This leaves most public medical clinics in rural areas not easily accessible.

### 4.2 Socio- economic profiles of respondents

Fifty five of the 124 (44.4%) villages in the Mutale municipality, Vhembe district of Limpopo were included in the study. One thousand (1000) households were selected to take part in the survey. A total of 941 respondents out of the 1000 who were consulted agreed to participate in the survey and provided responses to the questionnaire, yielding a response rate of 94.1%. The profiles of the respondents are provided in the

Tables 4.1 to 4.6 below. Respondents were all blacks and the ages of the 844 who gave their ages ranged from 16 to 75 years (mean age = 44.2, SD ± 13.2 years). The distributions of the ages are shown in Table 4.1. The largest age group, 237(28.1%) of respondents was in the 36-45 years age group. The smallest group was the age group 16-25 years, comprising 53 (6.3%). Out of a total of 941, only 932 gave their gender and 508 (54.5%) of these were males and 424 (45, 5%) were females.

**Table 4.1 Distribution of respondents by age groups**

| Age Group | Number | Percent (%) |
|---|---|---|
| 16-25 years | 53 | 6.3 |
| 26 - 35 years | 185 | 11.6 |
| 36 - 45 years | 237 | 28.1 |
| 46 - 55 years | 212 | 25.1 |
| 56 - 65 years | 100 | 11.8 |
| 66-75 years | 57 | 6.8 |
| Total | 844 | 100 |

### 4.2.1 Household size

The household sizes ranged from one to 27 members, with a mean of 5.92 and standard deviation of ± 2.59. The average number of persons per household who were aged ≥65 was 0.53, with a standard deviation (SD) of ± 0.73. The mean and standard deviations of other age groups in the sample are shown in Table 4.2.

**Table 4.2. The mean and standard deviation (SD) of different age groups**

| Composition of Households | Age (years) | |
|---|---|---|
| | Mean | SD |
| Total Household | 5.92 | 2.59 |
| Number of household members over 65 years | 0.53 | 0.73 |

| | | |
|---|---|---|
| Number of household members 18 - 64 years | 2.79 | 1.59 |
| Number of household members 6 – 17 years | 1.86 | 1.50 |
| Number of household members 5 years and below | 0.74 | 0.87 |

### 4.2.2 Employment

Out of the 927 respondents who answered the question on employment status, 588 (63.4%) were employed and 339 (36.6%) were unemployed. Among those who were employed, 564 (95.9%) reported the nature of their employment and 79.4% were employed on a full time basis and 18.4% were employed on part time basis (See Table 4.3). Others in the table refer to those who can be employed for a few days to a week.

**Table 4.3 Types of employment engaged in by the respondents.**

| Type of employment | Number | Percent (%) |
|---|---|---|
| Full Time | 448 | 79.4 |
| Part Time | 104 | 18.4 |
| Seasonal | 6 | 1.1 |
| Other | 6 | 1.1 |
| Total | 564 | 100 |

### 4.2.3 Income of the respondents

Of the 723 who stated their monthly income, less than a quarter (22.5%) had monthly income of less than R1200.00; 29.6% had monthly income more than R5000 and 23.2% did not indicate their income (See Table 4.4).

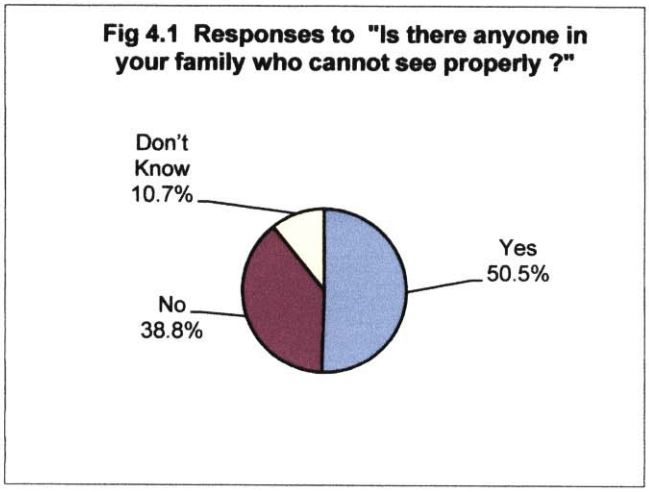
**Table 4.4 Monthly Household Incomes of the respondents**

| Income Group | Number | Percent (%) |
|---|---|---|
| Less than R1200 | 163 | 22.5 |
| R1201 - R3000 | 189 | 26.1 |

| | | |
|---|---|---|
| R3001 - R5000 | 157 | 21.7 |
| More than R5000 | 214 | 29.6 |
| Total | 723 | 100.0 |

## 4.3 The need for eye care services among the respondents

When the respondents were asked if there were any members of their households that could not see properly, and to indicate the nature of their inability to see properly; 918 responded to the question and 464 (50.6%) indicated that they had household members that could not see properly and 356 (38.8%) reported not having (See Figure 4.1).

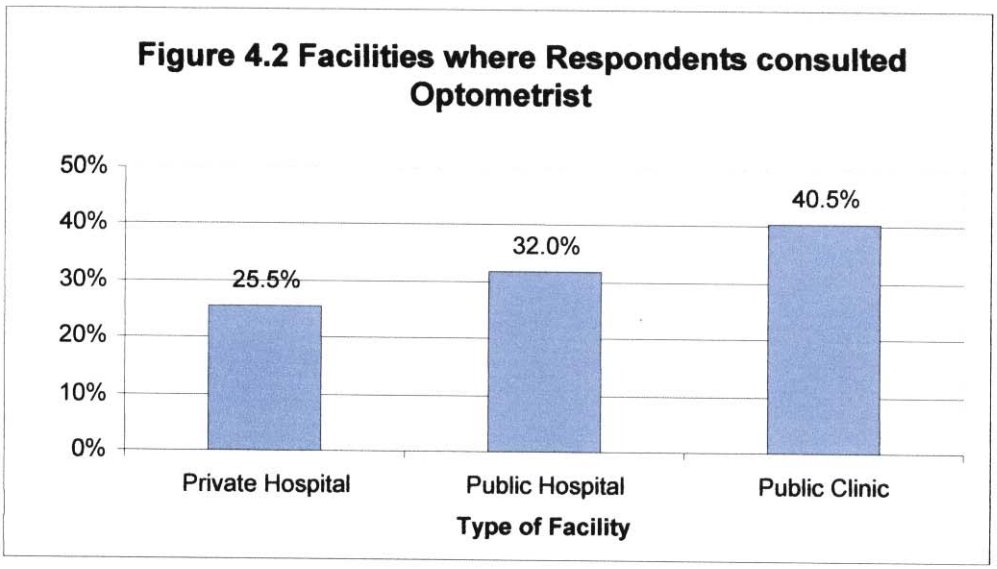



Out of those respondents who reported that they had household members who could not see properly, 365 (78.7%) reported the nature of impairment as not being able to see from far-away and 134 (28.9%) indicated that the problem was the inability to see near objects properly. About seventeen percent (17.4%) of the respondents reported they did not have a need to see an optometrist, 33.9% needed to see an optometrist but could not, 30.9% had consulted an optometrist and 17.8% did not know if they wanted to consult an optometrist.

## 4.4 Utilization and cost of Eye Care Services

Four hundred and eighty two respondents reported that they had used eye care services. Less than half of the respondents 195 (40.5%) used eye care services in the public medical clinics and 154 (32.0%) consulted at public medical hospitals and 123 (25.5%) received eye care services in the private medical hospitals (See Figure 4.2).

**Figure 4.2 Facilities where Respondents consulted Optometrist**




* Some Respondents may have consulted at more than one type of Facility.

About half of the 482 respondents (51.2%) who consulted an eye care practitioner, did so in the Mutale municipality. Eight (1.7%) did not know where they consulted. Other municipalities where respondents consulted are shown in Table 4.5.

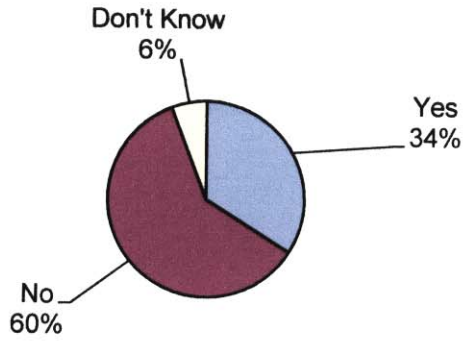
**Table 4.5 Municipality where respondents consulted for eye problems**

| Municipality consulted | Number | Percent (%)* |
|---|---|---|
| Mutale | 247 | 51.2 |
| Thulamela | 124 | 25.7 |
| Makhado | 22 | 4.6 |
| Musina | 62 | 12.9 |
| Elsewhere | 19 | 3.9 |

* Some Respondents might have consulted at more than one Municipality.

When asked if any household member had ever consulted an optometrist, out of 859 respondents, 291 (33.9%) replied in the affirmative while 518 (60.3%) reported that no member of their households had ever consulted an optometrist and 50 (5.8%) respondents did not know if any household member had ever consulted with an optometrist (See Figure 4.3).

**Figure 4.3 Have household Members consulted an Optometrist**




Over half 482 (55.9%) of the respondents indicated that household members had consulted a medical doctor for eye problems and 381 (44.1%) had not consulted a medical practitioner for eye problems. From the 840 respondents who responded to whether or not they had heard about the Phelophepha Health Care Train, only 31 (3.7%) of them had heard about the Train and 809 (96.3% ) had never heard of the train. Among the 31 who responded to whether or not they have had their eyes tested on the train, 14 (45.2%) reported "yes" and others 17 (54.8%) reported no. Two hundred and thirty six of the respondents reported to have consulted an optometrist and 151 (64.0%) paid between R100 and R200 for consultation (See Table 4.6).

**Table 4.6 How much was paid for consultating an optometrist?**

| Cost of consultation | Number | Percent |
|---|---|---|
| Less than R100 | 38 | 16.0% |
| R100 - R200 | 151 | 64.0% |
| More than R200 | 47 | 20.0% |
| Total | 236 | 100.0% |

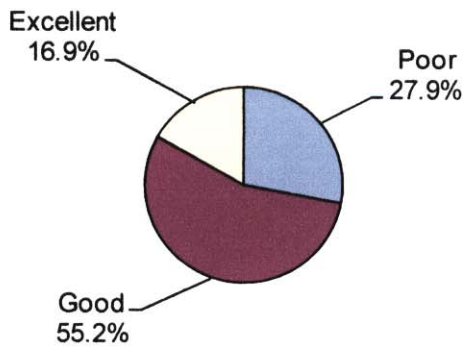
Out of the 231 respondents who have consulted and spectacles were prescribed and obtained, 61.5% indicated that they paid R1000-R2000, and 23.8% paid less than R1000 (See Table 4.7).

**Table 4.7 How much was paid for the spectacles**

| Cost of spectacles | Number | Percent |
|---|---|---|
| Less than R1000 | 55 | 23.8% |
| R1000 - R2000 | 142 | 61.5% |
| More than R2000 | 34 | 14.8% |
| Total | 231 | 100.0% |

Generally, respondents seemed satisfied with the level of service that they received in Mutale public health center and clinics. About 16.9% rated the services as excellent, 55.0% rated the services as good (See figure 4.4). Respondents did not indicate the ratings of other facilities from which they had consulted.

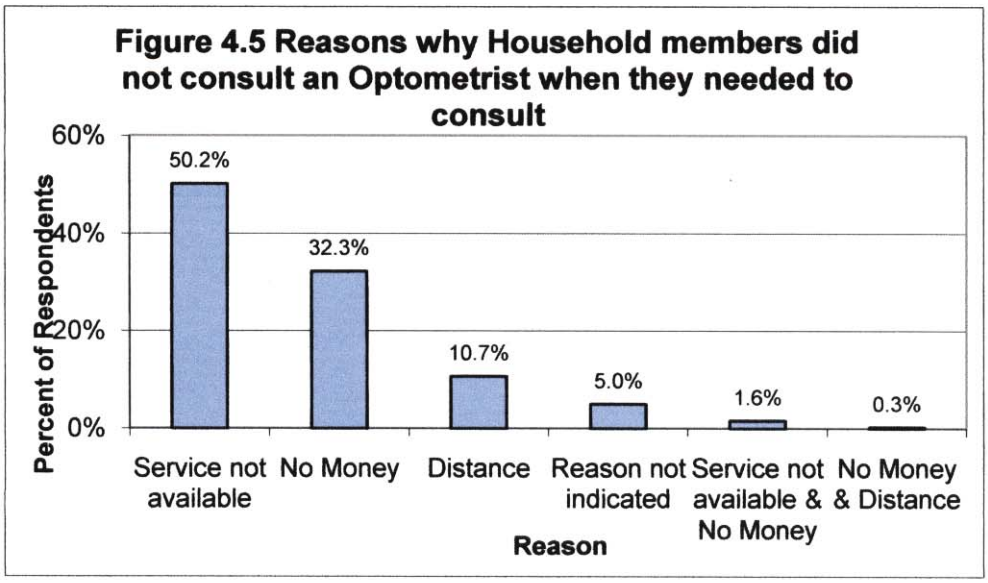
**Figure 4.4 Rating of Services from Optometrist**




Out of 807 respondents who reported usage of spectacles, 247 (30.6%) reported that someone in their households was wearing spectacles; others, 560 (69.4%) did not wear spectacles. Among the 782 respondents who reported on the type of eye care services that they would like to have in the Mutale Municipality, 538 (68,8%) reported optometric, 84 (10,7%) reported ophthalmologic and 160 (20,5%) reported mobile clinic.

## 4.5 Availability, Accessibility and Affordability of eye care services

From the (33.9%) respondents who reported to need the services of an optometrist but did not consult one for reasons of availability, accessibility or affordability. Out of a total of 319, about half (50.2%) reported that they could not consult because optometric services were not available,10.7% respondents could not access an optometrist because they had distance problems and 32.3% could not afford optometric services (See Figure 4.5).




## 4.6 Availability of optometric services

### 4.6.1 Logistic Regression Model 1: Availability

As reported earlier, (50.2%) of the respondents reported that they could not consult because optometric services were not available. Was availability a reason for the household members not consulting an optometrist? This model analyses the odds that availability was not the reason for household member not consulting an optometrist. This model was not statistically significant (Chi-square = 15.07, degrees of freedom = 10 and p-value = 0.13). None of the variables (age, gender, household size, and employment status or income group) was significantly associated with availability that is; being a factor in respondents not consulting an optometrist when they needed one.

## 4.7 Accessibility of eye care services

As stated earlier, 10.7% respondents could not consult an optometrist because of the long distance (See Figure 4.5). It was found that 86.4% of respondents traveled more than 10km to consult an optometrist; other findings are shown in Table 4.8.

**Table 4.8 Responses to distances travelled by household members to consult an optometrist.**

| Distance traveled | Number | Percent (%) |
|---|---|---|
| 10km or less | 17 | 6.8 |
| More than 10km | 216 | 86.4 |
| Don't Know | 17 | 6.8 |
| Total | 250 | 100.0 |

### 4.7.1 Logistic Regression Model 2: Accessibility

Was distance a reason for household members not consulting an optometrist? This model analyses the odds that distance was not the reason for household member not consulting an optometrist. This model was not statistically significant (Chi-square = 7.73, degrees of freedom = 10 and p-value = 0.67). Accessibility of optometric services was not associated with age, gender, household size, and employment status or income group ($p>0.05$).

## 4.8 Affordability of eye care services

About a third of the respondents (32.3%) reported they could not consult an optometrist because they did not have money.

### 4.8.1 Logistic Regression Model 3a: Affordability 1

This model analyses the odds that money was not the reason for household member not consulting an optometrist. The model is statistically significant at alpha = 0.01 (Chi-square value of 74.189 with 10 degrees of freedom, p-value = 0.000). The model explains about 31.3% of variability (Nagelkerke R; Square = 0.313). The model correctly predicts the dependent variable in 78.1% of the cases. It correctly predicts respondents who could afford to consult optometrists with 92.4% accuracy, but only correctly predicts those who could not afford with 33.8% accuracy. Only two of the independent variables are significant in the model: A3 – 2 (Number of household members 16 – 75 years old) and A5 (monthly income of household). **Appendix H**

The odds that money was not the reason for not consulting an optometrist decrease by about 35% for each extra person in the age range 18-64. The odds do not depend on number of household members in other age ranges. The odds that money was not the reason for not consulting an optometrist depend on the monthly household income. Households with monthly incomes less than R5000.00 were less likely to afford optometric services, compared to those in the highest income bracket of over R5000.00 per month. The odds are lower by about 93% for households with income less than R1200.00 per month; lower by about 84% for those with income between R1200 and R3000 and lower by about 70% for those in the category R3001 to R5000. All comparisons against the highest income category are statistically significant. (Details of the variables in the logistic regression analysis are shown in **(Appendix H).**

Table 4.9 shows that 81 out of 234 households (32.3%) claimed that household members could not consult an optometrist when needed because they had no money. (See Figure 4.6). The number of respondents who could not consult an optometrist due to financial reasons decreased with an increase in income (see Table 4.9)

**Table 4.9 Proportion of Households that did not consult optometrist when needed because of lack of money by Monthly Income of Household**

| **Monthly Household Income** | **Why household member did not consult an optometrist?: No Money** | | |
|---|---|---|---|
| | Yes | No | Total |
| Less than R1200 | 39 (59.1%) | 27 (40.9%) | 66 |
| R1201 - R3000 | 25 (36.8%) | 43 (63.2%) | 68 |
| R3001 - R5000 | 11 (21.6%) | 40 (78.4%) | 51 |
| More than R5000 | 6 (12.2%) | 43 (87.8%) | 49 |
| Total | 81 (34.6%) | 153 (65.4%) | 234 (100%) |

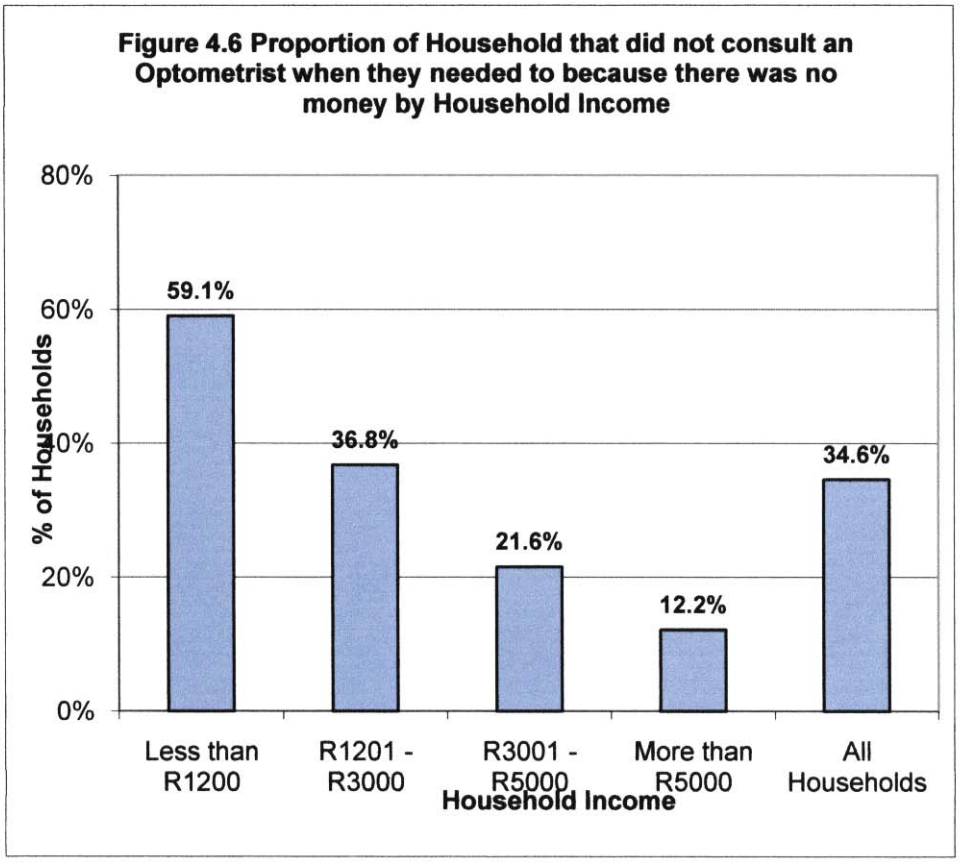



Figure 4.6 shows the effect of the total household income in the ability for the respondents to consult an optometrist when a need arises. For those in the R1200 and less income bracket, 59.1% could not afford to consult an optometrist. For those earning R1201-R3000, 36.8% could not consult an optometrist and from those earning R3001-R5000, 21.6% could not consult an optometrist. Out of those earning R5000 and above, only 12.2% could not consult an optometrist. Out of all the households, 34.6% could not afford to consult an optometrist due to financial reasons. Out of a total of 255 respondents who travelled to go consult an optometrist, 218 (85.5%) indicated that they paid more than R10.00 on transport to consult an optometrist, whereas 24 (9.4%) of the respondents paid R10.00 or less and 13 (5.1%) did not know how much they paid on transport to the optometrist. On consultation, 82% reported that they paid more than R100.00. Other findings are shown in Table 4.10.

**Table 4.10 Responses to the amount charged by optometrist for his/her services**

| Service fee | Number | Percent (%) |
|---|---|---|
| R100 or less | 25 | 10.2 |
| More than R100 | 201 | 82.0 |
| Don't Know | 19 | 7.8 |
| Total | 245 | 100 |

Responding to when last they obtained their current pair of glasses, a large proportion of the respondents 63.6% of the respondents received their current pair of glasses within the past two years of the study, 22.0% of whom received spectacles in a year or less and the other 41.6% in more than a year but less than two years (See Table 4.11).

**Table 4.11 How long ago did you get your current pair of glasses?**

| Duration of current pair | Number | Percent (%) |
|---|---|---|
| One year or less | 53 | 22.0 |
| Between 1 and 2 years | 102 | 41.6 |
| Between 3 and 4 years | 48 | 19.6 |
| More than 5 years | 38 | 15.5 |
| Total | 241 | 100 |

## 4.9 Logistic Regression Model 3b: Ability to pay for spectacles

Affordability 2. : It was not difficult to pay for the spectacles. This model analyses the odds of household member not finding it difficult to pay for the spectacles. The model is statistically significant at alpha = 0.01 (Chi-square =19.26 with 7 degrees of freedom, p-value = 0.01). The model accounts for only 14.7% of the total variability in the response (Nagelkerke R Square = 0.147). The model correctly predicts the odds of finding it difficult to pay for the services with 76.3% accuracy and predicts the odds of not finding it difficult to pay with 56.5% accuracy. The overall accuracy of the model is 68.1%. Factors that are significantly associated with ability to pay for the spectacles are age of the respondent and household size. Older respondents find it more difficult to pay for

the spectacles. The odds of being able to pay decrease by 4.2% for each one year increase in age. The odds of being able to pay for the spectacles also decrease with increasing size of household, the odds decreasing by 14.5% for each extra member of the household. Older respondents found it difficult to pay for both optometric services and for the spectacles as seen on the significance. Household size also makes it difficult to pay for both optometric services **(Appendix I).**

# Chapter 5

# DISCUSSION AND RECOMMENDATIONS

## 5.1 Introduction

There is an increasing recognition of the need to highlight the link between poverty, development and health care. Blindness, disabling visual impairment and the overall lack of eye-care services are too often the result of social, economic and developmental challenges of the developing world (Naidoo, 2007). Limpopo and the Eastern Cape of South Africa had the highest proportion of poverty with 77% and 72% of their populations living below the poverty income line, respectively (Schwabe, 2004) and Mutale municipality of Vhembe District of Limpopo Province is no exception. This research was done in a rural municipality with 17 medical clinics, 3 mobile clinics and 1 health centre servicing 124 villages. This municipality had only 1 emergency service situated in Tshilamba which is the only township and is the business hub of the municipality. Medical hospitals are situated in Thulamela municipality with Donald Fraser hospital being the nearest at 25 km South East of this municipality. Mutale municipality roads infrastructure is being improved with major routes to economic and tourist attraction areas as priority. This leaves most public medical clinics in rural areas not as accessible.

Information on the availability, accessibility and affordability of optometric services obtained from respondents from the rural Mutale municipality in Vhembe district of Limpopo province are discussed in this chapter. Although findings presented in this study may not apply to all the villages across South Africa as a whole, nonetheless they suggest that there are various rural areas where optometric services need to be addressed in terms of availability, accessibility and affordability. Even though most of the respondents who completed the questionnaire indicated they were employed on a full time basis (79.4%), 70, 3% of them were earning less than R5001 which makes it difficult to take care of their monthly family basic needs bearing in mind the mean of household sizes was 5.92 and (SD= ± 2.59). It has been indicated that the building of a

shopping mall which will employ 500 permanent and 300 temporal workers will bring some relief to the level of unemployment in Mutale municipality with an extra 1500 jobs to be created when the Mutale Municipality implements its Infrastructural Development Programmes (IDP) as indicated in their working plan (Dzebu, 2005). By the time this research was conducted, the shopping mall had not been built yet, leaving most of the municipality residents unemployed.

## 5.2 Socio- demographic profile of respondents

A total of 941 respondents out of the 1000 who were consulted to participate agreed to participate in the survey and provided responses to the questionnaire, yielding a response rate of 94.1%. The reason this research could not yield 100% of response is because some of the questionnaires were spoiled hence a 94.1% response. Of the 564 respondents who were employed and responded to the nature of employment, 79.4% were employed on a full time basis and 18.4% were employed on part time basis (See Table 4.3). Although the majority of the respondents (79.4%) were employed, their income was little making it difficult to afford a comfortable life, living most of them being unable to access and afford medical care in private medical structures. This was confirmed by the 70.3% of the respondents who, at the time of the research were earning R5000 or less.

## 5.3 Availability of optometric services

In many rural areas of the world, health care services are usually scarce, therefore conditions which could have been treated at an early stage are not attended to, hence may result in low vision and blindness (Oduntan, 2005). The area covered by Mutale rural municipality is 2345, 8750 square kilometers and consists of 124 villages as indicated above. In this study 60% of the respondents indicated that they had never consulted a doctor who gives spectacles (an optometrist) whereas 6% answered that they do not know if there had been any household member who has ever consulted with an optometrist (See Figure 4.5). The reason for so many respondents who had not consulted an optometrist is that there was no optometrist practicing in the municipality during the time of this survey hence optometric services not available. The researcher

visited the area including Tshilamba Township and found there was no optometrist practicing in the area. People in rural areas are generally more dependent on public and other health care services compared to people living in urban areas (Booyen, 2002). Most medical practitioners including optometrists do not want to work in rural settings where they are far from civilization making availability of medical care even more difficult. In South Africa, optometric services are provided mainly by private practitioners. Disproportionate distribution of optometry services in the urban/rural areas as is currently the case in South Africa and many parts of the developing world does not offer equal opportunity for patients (Oduntan *et al.,* 2007). The highest deficits of medical practitioners including optometrists occur in rural and remote areas even in Australia (Kiely, *et al.*, 2007). The unavailability of optometric services is supported by the 55.9% of the respondents who indicated that they had consulted a medical practitioner for eye problems. Consulting a general medical practitioner was probably because they had nowhere else to go for their ocular problems. Smaller urban settlement normally act as nearest service center for the rural population, which means availability of health services in towns has significant implication for the availability of health services in rural areas, including optometry (Booysen, 2002). It is the case in Mutale wherein rural dwellers (55, 9% of the respondents) went to Tshilamba Township to consult a general practitioner for eye problems. However, being rural dwellers with high level of illiteracy, there is a possibility that they also were not aware that there are special practitioners trained to attend to their eye problems.

From a total of 482 respondents who consulted for eye problems, 51.2% consulted at Mutale municipality (See Table 4.5) and out of these, 40.5% reported that they consulted in public medical clinics, 32.0% consulted in public medical hospitals and 25.5% consulted in private medical hospitals (Figure 4.2). The study site did not have optometrist's services or private medical hospitals when this research was conducted. This therefore suggests that the 25.5% that consulted privately did so, either with general practitioners in the municipality or in private medical hospitals outside the municipality (See Table 4.5). From the 482 respondents who consulted for eye problems, 25.7% consulted at Thulamela municipality, 12.9% consulted at Musina

municipality, 4.6% consulted at Makhado municipality and 3.9% elsewhere. The reason these respondents consulted outside Mutale municipality is because optometric services were not available in the area (See Table 4.5). These findings on availability are contrary to what the Optometry Research and Training Institute of Shri Rajaram Memorial Eye Hospital Society in India found wherein they have the Rural Mobile Clinic Schemes (RMCs) for providing Primary Medical and Health Care, eye care & social welfare to the needy poor at their door step in rural and remote areas in India (www.ortibanda.org/bk.jpg). The institute employs a multi-disciplinary approach with ophthalmologist, physician, radiologist, X-ray tech., pathologist, heart specialist, Optometrists, Optometric technicians, optician, and other health care professionals working together - to achieve its unique "layered" regiment of total health care.

Unavailability of optometric services in this study site is confirmed by the 250 respondents who travelled to other municipalities to consult an optometrist in which 216 (86.4%) travelled more than 10 km outside Mutale municipality with the nearest optometric services at 30km away in Thulamela municipality. Others travelled longer distances to Musina and Makhado municipalities.

These study results on availability are similar to a study done by the UK Public Health Primary Care Trust (2008) in three Districts of Cambridgeshire three of which are classified as rural accessible and one area (Fenland) classed as rural inaccessible with highest levels of socio-economic deprivation than other parts of Cambridgeshire wherein transport issues play a much stronger role in social exclusion in rural areas than in urban environments wherein people have low incomes and do not have their own transport are more likely to find in difficult to go consult optometrists and other medical services outside Cambridgeshire (especially those in Fenland) (www.ruralcommunities.gov.uk/files/CRC%2000EB%203.pdf).

There were 6.8% of respondents who travelled 10km or less to consult an optometrist. This could be true only if they consulted in a mobile optometric clinic. There was an optometrist who used to travel from Thulamela municipality in a mobile optometric clinic to render services in some of the schools in Mutale municipality. The mobile clinic

optometrist has stopped travelling to provide services in these schools for reasons not known to the researcher. Another 6.8% of the respondents reported that they did not know the number of kilometers they had traveled to consult an optometrist (See Table 4.8). The reason why they did not know the number of kilometers travelled could be because the greater population of Mutale municipality inhabitants. The reason some had traveled long distances confirms the unavailability of optometric services. Out of a total of 941 respondents (319) 33.9% needed to consult but could not for various reasons such as unavailability of services. The 160 respondents out of the 319 (50.2%) needed to see an optometrist but could not consult for reasons of availability (See Figure 4.5). These findings on availability of optometric services show that there are individuals who know that vision and ocular conditions have to be attended to by specialists who unfortunately were not available in the Mutale municipality.

Limpopo Province continues to advertise optometric posts with rural allowances (www.lintreasury.gov.za/application/circulars/SCAN0001.pdf). This governmental initiative is good and works for some municipality but the municipality in which this survey was done is not benefitting from this exercise. It has been reported rural-based universities are advantageously situated and possess a variety of characteristics that can enable them to effectively contribute to sustainable development. These include their strategic location within the rural communities; reinventing their mission orientation so as to enhance their research capacity; expanding their intellectual/entrepreneurial/social capital; and the establishment of strong collaborative relationships (Nkomo et al., 2007). As much as the University of Limpopo (Turfloop Campus) is doing a good job in producing optometrists; an establishment of the department of Optometry at the University of Venda, can be of great assistance to rural areas in the far North in Limpopo province including Mutale municipality. The benefits could be more in conjunction with the Department of Health providing optometric equipments for medical clinics, health centers and hospitals wherein students will be sent for practical under the supervision by already qualified optometric clinicians and the lecturing staff.

To make medical services available especially to rural communities, the Phelophepa

health train has become a well-known and trusted beacon of hope and better health in rural South Africa. A small proportion of 31 (3.7%) of the respondents in this study have heard about the Phelophepha health train and 809 (96.30%) out of 840 respondents have not heard about the Health Train. The reason for having such a small percentage of respondents' is because Mutale municipality does not have railway line hence the Pheophepha health train cannot access this municipality. Out of the 31respondents14 (45.2%) who indicated that they have had their eyes tested on the train and 17 (54.8%) had not. Those whose eyes were tested on the train did so outside Mutale municipality. Like in most other South African rural areas, dwellers move to big cities looking for better employment and that is where they could have their eyes tested in the train. These findings on poor availability of optometric services are similar to a study done in Papua New Guinea in which over 80% of the 4 million people live in a rural subsistence environment with an enormous need, for eye care and other medical services (Farmer, 2000). They were serviced by Government eye surgeons (3), who were overworked and located in the major centers, or 1 private ophthalmologist and 2 private optometrists who catered mainly for the few expatriates and the small number of wealthy national people. Even though they have developed a new strategy of training nurses to do ophthalmic nursing, they were not able to provide optometric services (Farmer, 2000).

This study on availability of optometric services is also supported by a study in Australia in which optometrists are concentrated in areas of high population with capital city regions and their surrounds well-serviced by optometrist whereas smaller geographic units with rural and remote areas called Local Government Areas (LGAs) with low populations generally have no optometrists. The highest excesses of optometrists occur in the capital city with (64, 60 and 28.4 equivalent full-time optometrists respectively). The highest deficits occur in rural and remote areas with (-16.4, -15.6 and -13.4 equivalent full-time optometrists, respectively) (Kiely, *et al.*, 2007).

There are 57.2% of respondents who indicated that they would like to have optometric eye care services provided in Mutale Municipality and 8.9% want ophthalmic services. Such a high percentage is proof that optometric services are not readily available in this municipality and the respondents would like to have them without having to travel long

distances. An initiative by SITA and the Medical Research Council of South Africa have developed a pilot project using telemedicine to provide primary health care in Limpopo province since availability of quality healthcare services has always been a daunting challenge in rural areas, partly due to limits in local expertise, resources, economic infrastructure and partly due to the difficulties in recruiting and retaining health professionals (Jovanovic, 2009). The project aims to connect rural and remote sites to tertiary or academic hospitals that will then serve as the hub sites, which in turn will service these remote clinics. In the pilot project, two hospitals in Limpopo (Mokopane and Polokwane) have been selected to act as support centers for two clinic sites (George Masebe Hospital and Rebone Clinic). This initiative like many more in South Africa does not service Mutale; one of the reasons being that the telecommunication in this municipality is very poor. The following variables cannot be directly associated with poor availability of optometric services in the municipality: Age (years) last birthday, Gender of Household Head (Categorical: Male or Female) or Household Size.

Logistic regression on availability of optometric services in Mutale municipality shows that this model was not statistically significant since the p-value = 0.13 (which is greater than 0.05). None of the variables (age, gender, household size, and employment status or income group) was significantly associated with availability that is; being a factor in respondents not consulting an optometrist when they needed one.

## 5.4 Accessibility of optometric services

Recent estimates from the World Health Organization (2000) indicate that 90 per cent of all those affected by visual impairment live in the poorest countries of the world. India is home to one-fifth of the world's visually impaired people and therefore, any strategies to combat avoidable blindness must take into account the socio-economic conditions within which people live (Khanna, 2007). In Australia access to care remains more critical in remote and rural areas because of distance. The demographic profiles of the professions also vary between regions, giving more urgency to workforce planning issues (Stuer, 2003). Stuer (2003) further shows that the Australian government has embarked on the delivery of a major rural health strategy aimed at increasing access to

health care in the rural and remote regions through the provision of more and better services (specialist services; multipurpose centers); attracting more health professionals (scholarships for health students; setting up of rural universities); and retaining and supporting those professionals in rural and remote areas (on-going training; support programs for families and overseas trained doctors; practice management and financial incentives).

From the respondents who completed the questionnaires in this study, 33.9% have consulted with a doctor who gives glasses (an optometrist) and 60.30% had never consulted an optometrist for many reasons including lack of accessibility (See Figure 4.5). One of the reasons for poor accessibility making 60.3% of the respondents not to consult was low income. It is indicated in table 4.5 that 70.3% of the respondents were earning less than R5001. These findings on accessibility of health care services are similar to a study done in most of the member countries of the Organization for Economic Cooperation and Development (OECD) with the aim to ensure equitable access to health care (van Doorslaer, 2006). van Doorslaer indicated that people with higher incomes are significantly more likely to see a specialist than people with lower incomes and, in most countries, also more frequently. Pro-rich inequity is especially large in Portugal, Finland and Ireland. In Mutale municipality, the respondents earning more than R5000 were able to travel to other municipalities seeking eye care as is the case in OECD countries indicated above. The study site did not have optometric services within its borders when this survey was conducted. The nearest optometrist to the respondents in this survey was 30km South West of the municipality. Accessing an optometrist 30km away was even difficult for the low income respondents. Low income and distance made it difficult for most respondents to access optometric services. This is confirmed by the 216 (86.4%) of the 250 respondents who had to travel a minimum of 30km and 218 (85.5%) of the 255 respondents whose transport fare was more than R10.00 single trip to go consult an optometrist. People with low income find it difficult to pay R10 to consult an optometrist; they rather use that money for some other items which seem more important to them than consulting. This is supported by a study done by Kiely ( 2007) in Australia in which the outcome showed that in the metropolitan

areas, people may live close to an optometric practice in a neighbouring Local Government Areas. In rural areas, a Local Government Areas may appear to have an adequate number of optometrists but some residents may be several hours from the nearest optometrist or the optometric service is provided on a part-time basis (Kiely *et al.*, 2007). Long distance travelling is one of the major indicators of poor accessibility in Mutale municipality. This therefore, suggests that the 33.9% of respondents who consulted an optometrist did so outside the municipality. A survey done by the Optometry Research and Training Institute of Shri Rajaram Memorial Eye Hospital Society in India yielded different results from what was found in this study. The Institute in India operates Rural Mobile Clinic Schemes (RMCs) and set up Camps for Immunization, Cataract, refraction and other medical services for the benefit of general public making eye care and other medical services accessible to most rural dwellers (www.ortibanda.org/bk.jpg).

The findings of this research showed that 55.9% of the respondents indicated that they had consulted a medical doctor for eye problems. This might indicate that the people of the municipality need optometric services but cannot access them, for that reason they consulted general practitioners as an alternative because there was no optometrist in the area. Also, poor accessibility to eye care services was confirmed by the 3.7% of the respondents who have heard about the Phelophepha Health Train and 96.3% have not heard about it. Out of the 31 respondents who responded to the question on whether they have ever heard of the Phelophepha Health Train, 45.2% indicated that they have had their eyes tested on the train and 54.8% had not. Anyone who has consulted in the health train has done so in another municipality or province since Mutale municipality has no railroad facilities. This analysis shows how inaccessible the health train is in this study site. Anyone who would like to consult in the train wouidl have to go to Musina or Makhado municipalities because these are the only two towns with rail road in the Vhembe District and there are 45,2% who consulted on the train and 54,8% from Mutale municipality who did not consult on the train.

From the 782 respondents who answered on the types of services that they would like to be rendered at Mutale municipality (538) 57.2% of respondents indicated that they would like to have optometric eye care services. Most of the roads are in poor conditions with just a few of them tarred (Dzebu, 2005). This makes accessibility to most villages difficult in a car making it difficult even for medical service providers to go provide service there. Private optometrist can work together with the Department of Health in making optometric services and other primary health care services accessible to the people of rural Mutale municipality with the help of the Military in terms of transportation to less accessible areas as a result of bad road conditions. This has been proven possible by the United States of America Air Force Medical Services in Alaska's most rural areas wherein the Optometry community of the Medical Services helped the Alaskans "see a brighter future" by providing primary eye-care services in a lightweight, mobile module that can be readily deployed to support active duty forces in wartime, or smaller scale contingencies.
(http://airforcemedicine.afms.mil/sg_newswire/jun_03/ArticCare.htm).

From the 319 respondents who could not consult an optometrist, only 11.0% indicated that they could not consult because of distance. These respondents would still travel to consult an optometrist if available within the municipality. Travelling expenses are a major concern to the respondents at low income bracket. Travelling within the municipality would be better than outside the municipality. This finding on accessibility to optometric services is contrary to the findings in a survey done in the state of Indiana in America wherein optometrist capacity was sufficient at both the state and county levels, and optometric services were appropriately distributed such that patient access to optometric care was geographically unburdened. Estimates regarding supply are elastic, depending on the assumptions applied (Marshall, 2000). Respondents who are mobile find it easy to travel to another municipality to consult whereas those who use public transport find it difficult to access such services. Present results indicate that (42,9%) consulted in other municipalities in which 25.7% consulted at Thulamela municipality, 12.9% consulted at Musina municipality 4.6% consulted at Makhado municipality and 3.9% elsewhere (See Table 4.5). Out of a total of 482 respondents who

consulted, 51.2% consulted at Mutale municipality. The reason for consulting at Mutale municipality where there is no optometrist is a desperate measure to those who are not able to travel to other municipalities for optometric services. In this study, 86.4% traveled more than 10km (minimum of 30km) to go consult an optometrist, 6.8% traveled 10km or less and another 6.8% did not know the number of kilometers they had traveled to consult an optometrist. (See Table 4.8) These findings on accessibility further confirm that distance makes it impossible for some respondents to consult an optometrist. It is cheaper to travel within the same municipality as compared to travelling outside the municipality. If services are available in the Mutale municipality, accessibility would be easier even for those earning between R1200 and R3000. Many respondents 218 (85.5%) out of 255 respondents indicated that they paid more than R10.00 on transport to consult an optometrist, 9.4% paid R10.00 or less and 5.1% did not know how much they had paid for their transportation. If optometric mobile clinics or optometric services are made available, that will cut out traveling expenses for the respondents and the same money could be used to add up on paying for the provision of eye care services.

From a total of 941 respondents, (482) 51.2% consulted in Mutale municipality (See Table 4.5). The medical facilities in which respondents consulted were 32% in a public hospital and 40.5% in community clinics (See Figure 4.2) wherein they received care from nurses (not necessarily ophthalmic nurses); again this is a desperate measure. These respondents needed to see an optometrist but could not for reasons of accessibility hence had to consult other health practitioners. From the overall total of 941 respondents, (34) 3.6% of the respondents could not consult an optometrist because of distance and out of a total of 319 respondents who could not consult an optometrist, (35) 10.7 % indicated that they could not consult an optometrist because of distance (Figure 4.5). The model analyses, the odds that distance was not the reason for household member not consulting an optometrist indicated that none of the variables was significantly associated with distance being a factor in respondents not consulting an optometrist when they needed one within the Mutale municipality if optometric services are available. This finding on accessibility is similar by a study which shows

that 25% of Americans leave in rural communities where, unfortunately, many do not have access to health care services including optometric services ( Bowyer,. et al, 2000). People living in these communities were less likely to use preventative screening services or have less access to emergency and specialized services. This is also the case in Australia wherein therewais an inadequate access to eye care services and limited awareness of eye health issues were believed to be factors contributing to the relatively poor ocular health of the Aboriginal and Torres Strait Islander (A&TSI) population.

Limited physical accessibility of optometric services, cultural barriers and education were identified as the three main issues contributing to the low utilisation rate of currently available services by A&TSI people. (Wood *et al., 1996*). The findings of that survey on accessibility indicate a need for improvement in the optometric services offered to A&TSI communities in terms of their nature and accessibility which is the case in Mutale municipality. On the other hand, findings in that study on accessibility of optometric services is contrary to that of a study done in the remote villages in southern India in which thousands of residents have easy access to eye care through a specially designed, low-cost and long-distance wi-fi network. The network allows specialists at Aravind Eye Hospital at Theni, in the state of Tamil Nadu, to interview and examine patients in nine remote clinics via high-quality video conference (Jimenez, 2007). The author further indicated that 2500 patients were able to receive eye care services through this network each month and that the network was being expanded to include 50 more clinics which in total will serve more than half a million patients each year in rural South India, most of whom had no access to eye care.

The study done at Mutale municipality and the one done at Aravind Eye Hospital in Theni were done in two different geographical locations in two different continents. They differ so greatly even though they are both done in rural areas. It appears that the villages of southern India were more advanced in technology than the villages around Mutale municipality. Community medical clinics around Mutale municipality do not have optometric equipments and video conferencing facilities are non- existing. This shows

that even though Mutale municipality has no optometrist, the same initiatives used in southern India can bring a great difference in providing optometric services in the municipality, should they be provided for. Accessibility will be improved through this cheap technological advancement. Even though SITA and the Medical Research Council have embarked on a pilot project of telemedicine, it has not been implemented in the researcher's study site. This finding on accessibility is also contrary to a study done in the Mankweng health subdistrict wherein 7% of respondents accessed optometric services from the University of Limpopo (Turfloop branch), 10.8% from Mankweng hospital, 33.3% from optometric clinics in Pietersburg and 48.9% from other places including community clinics and Phelophepa health care train (Oduntan,. et al, 2001). In this community, distance was not a problem because the services were being rendered in five different eye care structures which were accessible to most community members. These facilities also encompass people from different classes in community.

Even though both surveys were done in rural areas of Limpopo province, the greatest difference between the Mutale and Mankweng is that Mankweng has optometric facilities at a close range to the communities. The University optometric department is within the community; so is the Mankweng hospital. The city of Pietersburg (Polokwane) is 30km away from this community where most people do their shopping whereas Mutale municipality does not have a hospital. Mutale municipality only has one medical health center and 17 community clinics which are inadequately equipped and staffed and are without optometric services. Kovin Naidoo has been credited with placing public health issues in South Africa in primary eye care on the world optometric agenda, and has been instrumental in expanding optometry services in the public sector, both in South Africa and elsewhere in Africa. His proposal for an eye care programme in KwaZulu-Natal has seen over 130 000 children screened and 84 vision screeners trained, and his proposal for a District Eye Care Model and service delivery programme for KwaZulu-Natal has received a grant of R10 million for its implementation ( Van Zyl, 2007). The same eye care programme can work for Vhembe District; particularly for rural municipalities such as Mutale in which local practitioners and local volunteer organizations will have to own the initiative for the reason of sustainability. For it to yield

good results fast, this approach should be made by the volunteer organisations in addressing the unmet need for refractive correction. This is confirmed by what happened in Thailand in which the provision of direct clinical services by most foreign volunteers did not directly build local capacity and had hinder development of sustainable local services. Adopting public health approaches will enable volunteer provider organisations to dramatically increase their program effectiveness and output, while developing local capacities in a sustainable way (Vincent *et al.*, 2007)

Logistic Regression on accessibility was not statistically significant in this model since the p-value was 0.67. Accessibility of optometric services was not associated with age, gender, household size, and employment status or income group ($p>0.05$).

## 5.5 Affordability of optometric services

A study report on for new estimates of poverty shows that the proportion of people living in poverty in South Africa has not changed significantly between 1996 and 2001. However, those households living in poverty have sunk deeper into poverty and the gap between rich and poor has widened (Shwabe, 2004). Schwabe continues to indicate that approximately 57% of individuals in South Africa were living below the poverty income line in 2001, unchanged from 1996. Limpopo and the Eastern Cape had the highest proportion of poverty with 77% and 72% of their populations living below the poverty income line, respectively and Mutale municipality is no exception.

As indicated by the socio-demographic characteristics in this study, out of all the households 70, 3% of respondents were earning from R1200 or less to R5000 a month's and could not afford optometric services (See Figure 4.6). These individuals would find it difficult to have a medical aid as a result of low income hence difficulties in paying for medical services including optometric services. A study report in South Africa shows that fewer people residing in rural areas and smaller urban settlements have access to medical aid compared to persons residing in larger urban centers and the reason for this is that the main criterion for access to medical aid is formal employment and unemployment levels in rural areas and small towns are generally relatively high

compared to larger urban centres (Booyen, 2002). In Pennsylvania, individuals with blindness and vision impairment reported having more access problems related to cost of care, availability of insurance coverage, transportation issues, and refusal of services by providers, although they do not report lower rates of having a usual source of care compared to those without vision impairment (Spencer, 2009).The increase in medical cost risk overall for visually impaired (Program of All-Inclusive Care for the Elderly ) PACE participants was 10%, increasing to 13% for the non-institutionalized, community-based cohort, but PACE participants in nursing homes with vision loss did not generally result in increased costs (Morse, 2009). It therefore means that problems of affordability of optometric services are not only in Mutale rural areas but also in most other rural areas of the world including developed countries such as America. Governmental and other welfare organizations are needed in subsidizing or providing free optometric and other medical services for free to the low income individuals especially in rural areas.

Of the 319 (33.9 %) who had the need to consult an optometrist but could not 32.3% reported not having money (See Figure 4.5). These respondents were willing to pay for optometric services including spectacles but could not as a result of low income and the size of the household. This finding on affordability is similar to the one done by Ramke (2008) in Cambodia with 293 people participating in the study and 252 (86%) provided internally valid willingness-to-pay responses from which data were analysed. Many 193 (76.6%) were willing to pay at least KHR1500 (US$0.38) for spectacles. Multivariate analysis showed an increased likelihood of being unwilling to pay at least KHR1500 for spectacles in the future and was significantly and independently associated with being ⩾60 years old, attending Kor or Svay Teap health centres, not being an income earner in the household and having a household monthly income of less than KHR50 000.

In Victoria of Australia there are specific groups of low income people who face unnecessary vision impairment and vision loss as a result of financial hardship. This led to the establishment of the Victoria Eye care Service which subsidizes the cost of eye care (Brotherhood of St Laurence, 2004). The findings on affordability done by the Brotherhood of St Laurence (2004) also indicated that approximately 30% of the patient

population in developing countries need spectacles correction but could not afford correction devices. The study further indicated that in many areas of the world spectacles are either not available or are too expensive (Holden,et al, 2000). In the present study, respondents in the R1200 and less income bracket, 59.1% could not afford to consult an optometrist (See Table 4.9). This finding is similar to a study which suggests that more than 5% of the US population reported an unmet need for eyeglasses. Out of this 5%, more than 80% cited financial reasons as a primary barrier (Hodges, 1999). For those respondents from Mutale municipality earning R1201-R3000, 36.8% could not consult an optometrist and from those earning R3001-R5000, 21.6% could not consult an optometrist whereas from those earning R5000 and above, only 12.2% could not consult an optometrist (See Table 4.9). As indicated by the findings, the low income respondents find it much harder to consult an optometrist than those earning better wages. The same pattern was reported in Gurage Zone of Ethiopia where the majority of the causes of visual impairment and blindness are treatable (cataract) or preventable (trachomatous trichiasis).

The main barrier for seeking service was related to the indirect medical costs of the service and the low income households found it more difficult to consult (Melese, 2004). This suggests that efforts are needed to create mechanisms that 'bridge' communities and eye care facilities. These findings on affordability are also similar to a study done in Timor-Leste (also called Eat Timor) which indicated that unmet refractive error need was 11.7% and unmet presbyopic need was 32.3%. Lower correction coverage was associated with rural domicile, illiteracy and farming of the respondents with refractive errors, 96% were willing to wear spectacles correcting impaired vision. Out of the 96%, 17.0% were willing to pay US $3 and 50, 2% could not because of poor socioeconomic status. There is a great need for spectacles in this community, especially for the elderly and illiterate people, farmers and rural dwellers: those least able to pay for them (Ramke, 2007). Logistic Regression on affordability shows that the model is statistically significant at alpha = 0.01 which is less than 0.05. It correctly predicts respondents who could afford to consult optometrists with 92.4% accuracy, but only correctly predicts those who could not afford with 33.8% accuracy. Age of household head and household

size were associated with inability to afford optometric services.

## 5.6 Conclusion

The state of eye care in Africa stands in alarming contrast to that in the rest of the world. Poor practitioner-to-patient ratios, absence of eye-care personnel, inadequate facilities, poor state funding and a lack of educational programs are the hallmarks of eye care in Africa, with preventable and treatable conditions being the leading cause of blindness. Eye diseases causing preventable blindness are often the result of a combination of factors such as poverty, lack of education and inadequate health-care services (Naidoo, 2007). A crucial element of the effective delivery of refractive eye care services is the provision of affordable vision correction devices. While there are a number of options for vision correction (e.g., contact lenses, refractive surgery, etc.), spectacles is the simplest and most inexpensive option. However, in many areas of the world spectacles are either not available or are too expensive. While having adequately trained practitioners is essential to providing refraction and eye care to communities, this care must be supported with the devices needed to restore sight (Holden et al., 2000).

Report indicates that 50, 2% of the respondents reported that they could not consult an optometrist because such services were not available in the Mutale municipality. Over half 482 (55, 9%) of the respondents indicated that household members had consulted medical practitioners instead of optometrists for eye problems and refractive errors, indicating the lack of availability of optometric services in the Mutale municipality. More optometrists are needed in these communities.

A lack of accessibility to optometric services in this study is indicated by the 60, 3% of the respondents who had never consulted an optometrist because they did not have the money to travel to the nearest optometrist. Respondents of up to 86,4% had to travel more than 10km to the nearest optometrist and 85,5% of the respondents had to pay more than R10 single trip to an optometrist's office. The majority of those respondents (82, 0%) who consulted an optometrist reported having paid more than R100 on consultation which they could not afford. Distance and expenses make it difficult for the

majority of the respondents to consult an optometrist.

In this study, factors that are significantly associated with ability to pay for the spectacles are Age of household head and household size. Older respondents found it more difficult to pay for the spectacles. The odds of being able to pay decrease by about 4.2% for each one year increase in age. The odds of being able to pay for the spectacles also decrease with increasing size of household, the odds decreasing by about 14.5% for each extra member of the household. Older respondents reported finding it difficult to pay for both optometric services and for the spectacles as seen on the significance. Household size also makes it difficult to pay for both optometric services and spectacles. The bigger the family, the more difficult it is to pay for optometric services, even when the salary is R5000 or more. Details of the variables in the regression are in Appendix 3.

## 5.7 Recommendations

The following recommendations will take care of the problems identified in this study:

1. Recruiting optometrists both in practice and those who are recently qualified from Universities to be available for servicing rural clinics and communities in the Mutale municipality. This can be achieved by giving those benefits such as a better salary, housing and car allowance and other incentives.
2. While having adequately trained practitioners is essential to providing refraction and eye care to communities, this care must be supported with the necessary optometric equipments needed for refraction and lenses and frames to restore sight.
3. The government must develop a program that subsidizes spectacles for patients in need. For any system to be truly effective, it must be sustainable. An equitable cross-subsidization spectacles system should be possible.
4. Making reading spectacles readily available for purchase for the disadvantaged communities of the Mutale municipality. This will also need ophthalmic nurses to be trained on how to dispense such spectacles with the age of a patient being a guideline as to what strength of the lenses will be suitable for a particular patient.

5. Government must not only supply cheap spectacle in a chosen few hospitals. It must extend the services to rural clinics and provide fully equipped consultation rooms with subsidized quality spectacles and the services should be sustainable.
6. An initiative by SITA and the Medical Research Council of South Africa on telemedicine should be extended to Mutale municipality medical facilities.
7. Access to eye care services can be made easy through a specially designed, low-cost and long-distance wi-fi network which allows specialists to interview and examine patients in remote clinics via high-quality video conference.
8. Educating our rural communities on the different types of medical services available for use.
9. Optometry Departments from different universities should collaborate with public clinics and hospitals so they can dispatch optometry students to these facilities with the supervision of the lecturing staff who also will be mandated to coordinate the whole program.
10. An introduction of medical missions as previously done by Christians in many developing countries. These missions should among others focus on optometric services and eye care services in general for this community.

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# Appendices

**Appendix A1: Questionnaire.**

**Questionnaire: Investigation of availability, accessibility and affordability of optometric services in rural Mutale municipality of Vhembe district, Limpopo Province, South Africa.**

**Dear participant,**

*This survey is being conducted in Mutale municipality of South Africa, to assess the availability, accessibility and affordability of optometric services. The outcome of this study will assist in guiding our health department provincially to address the distribution and equipping our health facilities with optometrists where there is a need. Your input in completing this questionnaire is very valuable. It should take you not longer than 15 minutes to complete this questionnaire and your responses will be kept strictly confidential. Your co-operation is greatly appreciated.*

**Investigation of availability, accessibility and affordability of optometric services in rural Mutale municipality of Vhembe District, Limpopo Province, South Africa.**

| Questionnaire Number: | |
|---|---|

**SECTION A**

## 1. Socio-Demographic Characteristics

1 Age (years) last birthday

2 Gender of household head Male 1
Female 2

3 3.1 Employment Status of household head

Employed 1
Unemployed 2

3.2 If employed, please indicate type of Employment

Full-time 1

employment

Part-time Employment 2

Seasonal Employment 3

Other (specify) 4

4 Monthly Income of Household

Less than R1200 1

R1201 - R3000 2

R3001 – R5000 3

More than R5000 4

5 Please indicate the number of household members in each of the following age categories:

Over 65 years

18 – 64 years

6 – 18 years

5 years and below

**SECTION B**

6 Have you heard of Phelophepa Health Care Train Yes 1

No 2

Have you or any household member had eyes tested on the train? Yes 1

No 2

If Yes, in which station was the person eyes tested? (Write down name of train station)

7 What kind of eye-care services would you like to have in Mutale Municipality?

Optometric Services 1

Ophthalmology 2

Mobile Clinic 3

## 2. The need for eye care services in households

| | | | |
|---|---|---|---|
| 8 | 8.1 Is there anyone in your family who cannot see properly? | Yes | 1 |
| | | No | 2 |
| | | Don't know | 3 |
| | 8.2 If yes, how many family members cannot see properly | 1 | 1 |
| | | 2 | 2 |
| | | More than 2 | 3 |

8.3 Is there any member of your household who

| | | |
|---|---|---|
| 8.3.1 Cannot see far-away objects clearly | Yes | 1 |
| | No | 2 |
| 8.3.2 Cannot see near objects clearly | Yes | 1 |
| | No | 2 |

| | | |
|---|---|---|
| 9.1 Have you or any member of your household ever consulted a medical practitioner for eye problems | Yes | 1 |
| | No | 2 |

| | | |
|---|---|---|
| 9.2 Has any member of your household ever consulted with a doctor who gives glasses (optometrist)? | Yes | 1 |
| | No | 2 |
| | Don't Know | 3 |

## 3. Analysis of Availability, Affordability and Accessibility of Eye Care Services

9.2 If you answered No to Question 9.2, why did no household member consult an optometrist? (Tick all that apply)

| | |
|---|---|
| No Money | 1 |
| Distance | 2 |
| Service not available | 3 |
| No need to see one | 4 |

## 4. Utilization of Eye Care Services by Residents of Mutale Municipality

| | | |
|---|---|---|
| 10.1 Where did you consult? | Private Hospital | 1 |
| | Public Hospital | 2 |
| | Public Clinic | 3 |

10.2 In which area did you consult? (Tick all that apply)

| | |
|---|---|
| Mutale | 1 |
| Thulamela | 2 |
| Makhado | 3 |
| Musina | 4 |
| Elsewhere | 5 |

10.3 How would you rate services rendered to you?

| | |
|---|---|
| Poor | 1 |
| Good | 2 |
| Excellent | 3 |

11.1 Do you or anyone in your household wear glasses

| | |
|---|---|
| Yes | 1 |
| No | 2 |

11.2 If Yes, how far did the household member have to travel to see the optometrist

| | |
|---|---|
| 10km or less | 1 |
| More than 10km | 2 |
| Don't Know | 3 |

11.3 How much did the household member pay to travel to see the optometrist

| | |
|---|---|
| R10 or less | 1 |
| More than R10 | 2 |
| Don't Know | 3 |

11.4 How much did the optometrist charge for his/her services

| | | |
|---|---|---|
| R100 or less | 1 | 1 |
| More than R100 | 2 | 2 |
| Don't Know | 3 | 3 |

11.5 How long ago did the person get the current pair of glasses?

| | |
|---|---|
| One year or less | 1 |
| Between 1 and 2 years | 2 |
| Between 3 and 4 years | 3 |
| More than 5 years | 4 |

11.6 How much was paid for consultation?

| | |
|---|---|
| Less than R100 | 1 |
| R100 – R200 | 2 |
| More than R200 | 3 |

11.7 How much did was paid for the spectacles

| | |
|---|---|
| Less than R1000 | 1 |
| R1000 – R2000 | 2 |
| More than R2000 | 3 |

**THANK YOU for completing the questionnaire**

# ZWITUMETSHEDZWA

**Thumetshedzo A 2: Sethe ya mbudziso**

**Sethe ya mbudziso: Tsedzuluso ya u vha hone, u wanalea na u swikelea ha tshumelo dza zwa vhuilafhamaṱo kha Masipala wa mahayani wa Mutale kha tshiṱiriki tsha Vhembe, Vundu ḽa Limpopo, Afrika-Tshipembe.**

**Ha mudzheneli,**
*Hei tsedzuluso i khou itwa kha Masipala wa Mutale wa Afrika-Tshipembe, kha u thathuvha u vha hone, u wanalea na u swikelea ha tshumelo dza zwa vhuilafhamato. Mawanwa a hei ngudo a do thusa kha u sumbedza Muhasho washu wa Mutakalo wa Vundu kha u isedza phadaladzo na u khwinifhadza zwishumiswa zwashu zwa mutakalo nga nanga dza mato hune ha vha na thodea. Mahumbulwa avho kha u fhindula hei sethe ya mbudziso ndi a ndemesa. Zwi fanela u sa vha dzhiela minete i no fhira fumi na mitanu (15) kha u fhindula hei sethe ya mbudziso nahone phindulo dzavho dzi do vhewa lwa tshidzumbe. Tshumisano yavho i khou tanganedzwa nga maanda.*

**Tsedzuluso ya u vha hone, u wanalea na u swikelea ha tshumelo dza zwa vhuilafhamaṱo kha Masipala wa mahayani wa Mutale kha tshiṱiriki tsha Vhembe, Vundu ḽa Limpopo, Afrika-Tshipembe.**

| | |
|---|---|
| Thumeledzo Nomboro: | |

**LUTA A**

## 1. Socio-Demographic Characteristics

1 Vhukale (minwaha) last birthday

2 Mbeu ya thoho ya mudi Munna 1

3 3.1 U tholwa na u sa tholwa ha thoho ya mudi

U tholwa 1
U sa tholwa 2

3.2Arali vho tholwa, vha shuma lwa tshothe naa

Lwa tshothe 1
Lw tshifhinga nyana 2
Lwa dzikhalanwaha 3
Zwinwe(sumbedza) 4

4 Muholo nga nwedzi

Fhasi ha kana R1200 1
R1201 - R3000 2
R3001 – R5000 3
U fhira R5000 4

5 Kha vha sumbedze nomboro ya vhathu vhano dzula na vho kha zwitenwa zwi tevhelaho:

Ntha ha minwaha 65
Minwaha ya 18 – 64
Minwaha ya 6 – 18
Minwaha ya 5 na u tsa

**LUTA B**

6 Vho no pfa nga ha Phelophepa Health Care Train? Ee 1
Hai 2

Hun a wa havho ono tolwaho mato tshidimelani? Ee 1
Hai 2

Arali zwo ralo,o tolwa kha tshititshi tshifhiyo?
(Vha nwale dzina la tshititshi)

7 Vha takalela u wana tshumelo de dza mato kha masipala wa Mutale ?

Dokotela wa ngilasi 1
Dokotela wa u ara mato 2
Kiliniki Thendeleki 3

## 2. Thodeya ya tshumelo dza ato mitani

8 8.1 Hu na munwe a sa koniho u vhona zwavhudi mutani wa havho? Ee 1
Hai 2
Thi divhi 3

8.2 Arali e hone, ndi mirado mingana ya muta I sa vhoniho 1 1
2 2
U fhira 2 3

8.3 Hu na murado na wa muta ane a sa
8.3.1 Kone u vhona zwa kule naa Ee 1
Hai 2

8.3.2 Kone u vhona zwa tsini Ee 1
Hai 2

9.1 Hu na murado wa muta o no vhonanaho a nanga ya u thathuvha muvhili a tshi yela mato naa Ee 1
Hai 2

9.2 Hu na murado wa muta ono vhonanaho nananga ya mato wa dzingilasi (optometrist)? Ee 1
Hai 2
Thi divhi 3

## 3. Tseduluso ya u vha hone, u wanalea na u swikelelea ha tshumelo dza mato

9.2 Arali phindulo I Hai kha mbudziso 9.2, ndi ngani murado wa muta o kundelwa u tolwa nga nanga ya u nea ngilasi (Swayani hoteaho)

A huna tshelede 1
Tshikhala 2
Tshumelo a I ho 3

Zwo vha zwi sa 4
vhofhi

## 4. U shumiswa ha tshumelo dza mato nga vhadzulapo vha masipala wa Mutale

10.1 Vho tolwafhi?

Vhuongelo ha phuraivete 1
Vhuongelo ha nnyi na nnyi 2
Kiliniki ya nnyi na nnyi 3

10.2 Vho tolwa mato kha masipala u fhio area did you consult? (Swayani ho teaho)

Mutale 1
Thulamela 2
Makhado 3
Musina 4
Elsewhere 5

10.3 Tshumelo ya hone vha I vhona hani?

A I nyauli 1
Ya vhudi 2
Mathakheni 3

11.1 Hu na vha ambaraho ngilasi ha hvho naa?

Ee 1
Hai 2

11.2 Arali e hone, vho tshimbila lwendo lu ngafhani u ya u vhon nanga ya mato

10km na fhasi 1
U fhira 10km 2
Thi divhi 3

11.3 Vho badela vhugai u ya u vhona nanga ya mato

R10 na u tsa 1
U fhira R10 2
Thi divhi 3

11.4 Vho badela vhugai u vhonwa nga nanga ya mato

R100 na u tsa 1 1
U fhira R100 2 2
Thi divhi 3 3

11.5 Mangilasi a muthu uyo o wanala lini?

Zwi na nwaha na u tsa 1
Vhukati ha nwaha 1 na 2 2
Vhukati ha nwaha 3 na 4 3
U fhira minwaha 5 4

11.6 Vho badela vhugai u thathuvhiwa?

R100 na u tsa 1
R100 – R200 2

U fhira R200 3

11.7 Vho badela vhugai ya mangilasi 1

R1000 – R2000 2

U fhira R2000 3

**Ro livhuwa vho dadza thumetshedzo iyi**

## *Appendix B*

## *Sampling the study population*

The sample size is determined to achieve a 90% power and 5% significance level, using the following equation recommended by Adamchak et al (2000) :

$$n = \frac{D\left[z_\alpha \sqrt{(2p(1-p))} + z_\beta \sqrt{(p_1(1-p_1) + p_2(1-p_2))}\right]^{1/2}}{(p_2 - p_1)^2}$$

*Where,*

*D = design effect, a correction for loss of sampling efficiency for using cluster sampling as opposed to simple random sampling as will be explained later in sample design discussion;*
*$z_a$= the z-score corresponding to the probability with which it is desired to be able to conclude that an observed change of size ($p_2$ - $p_1$) would not have occurred by chance;*
*$p$ = ($p_1$ + $p_2$) / 2;*
*$z_b$= the z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size ($p_2$ - $p_1$), if one actually occurred;*
*$p_1$ = the estimated proportion at the time of the first survey; and*
*$p_2$ = the proportion at some future date such that the quantity ($p_2$ - $p_1$) is the size of the magnitude of change it is desired to be able to detect.*

A starting value of $p_1$ = 0.5 is adopted for all the indicators to be monitored since there are no prior estimates available. Assigning $p_1$ a value of 0.5 for all indicators because variances of indicators measured as proportions are maximized as they approach 0.5 thereby ensuring that the sample size chosen will be large enough to produce reliable estimates.

A targeted detectable change ($p_2$ - $p_1$) of 10 percentage points was adopted for the requirements of calculating the sample size.

In order to detect this change at 95% level of significance and 90% power and applying a Design Effect correction factor (D) of 2, a sample size of 841 is required.

This would be the sample size if sampling from an infinitely large population. Applying a finite population correction (with the population size of 17818 households), the sample size is $n$ = 803.

This number is increased by 10% to cover for non-response, bringing the sample size to 883.

***Sampling Villages and households***

A two-stage sampling procedure is proposed to first select Villages and then select households from the villages in the second stage.

In the first stage, a simple random sample of villages will be selected from the N = 124 villages in Mutale District to estimate proportions of the population that are aware of various aspects ... It is assumed that estimates will be made with 90% confidence and a margin of error of 5 percentage points. It is further estimated that the level of awareness is not more than 30%. With these assumptions, the sample size required is $n = 55$.

Villages are put into three groups. Group A consists of approximately the smallest one-third of villages (with less than 90 households), Group B consists of approximately the middle one-third (with between 90 and 139 households) and Group C consists of villages with 150 or more households.

The sample size of 55 is distributed according to the number of villages in each group. Thus, 20 villages will be sampled from group A, 17 from group B and 18 from Group C.

At the second stage of sampling, a stratified random sampling procedure will be used to select the households, the strata being determined by the Groups defined above. The Groups are first weighted according to the total number of households in each group. The weights are 0.116 from Group A, 0.251 from Group B and 0.633 from Group C. The total sample size of 1000 households is distributed according to these weights, so that 116 are to be selected from Group A, 251 from Group B and the remaining 633 from Group C.

Finally, the number of households per selected village is determined by dividing 116 for Group A over the 20 villages, 251 for Group B over the 17 villages and 633 for Group C over the 18 villages. After rounding up and re-adjusting, final number of households per village and total number of households for each group are calculated. The results are shown in Table 1.

The complex samples module SPSS 14.0 was used to select

| Group | Weight | Number of selected villages | Number households per selected village | Total number of households selected from group |
|---|---|---|---|---|
| A | 0.116 | 20 | 6 | 120 |
| B | 0.251 | 17 | 15 | 255 |
| C | 0.633 | 18 | 35 | 630 |
| **Total** | **1** | **55** | | **1005** |

Table 1 Distribution of sample according to Groups.

**Appendix B 2**

| | Village | Number of Households | Group | Selected? |
|---|---|---|---|---|
| 1 | Makololwe | 15 | A | No |
| 2 | Mufongodi | 15 | A | No |
| 3 | Tshakani | 15 | A | No |
| 4 | Gwakwani | 18 | A | Yes |
| 5 | Ha-Gumbu | 18 | A | Yes |
| 6 | Tshilamusi | 18 | A | No |
| 7 | Bende Mutale | 21 | A | Yes |
| 8 | Duluthulwa | 21 | A | No |
| 9 | Tshamavhudzi | 24 | A | No |
| 10 | Tshikalani | 24 | A | Yes |
| 11 | Guyna | 24 | A | Yes |
| 12 | Gwagwathini | 24 | A | Yes |
| 13 | Mutshuludi | 24 | A | No |
| 14 | Tshamutore | 24 | A | No |
| 15 | Tshivaloni | 24 | A | No |
| 16 | Beleni | 30 | A | No |
| 17 | Tsangwa | 30 | A | Yes |
| 18 | Khunguni | 33 | A | No |
| 19 | Dotha | 36 | A | Yes |
| 20 | Matatani | 36 | A | No |
| 21 | Tshirunzini | 36 | A | Yes |
| 22 | Mukununele | 44 | A | No |
| 23 | Mafohoni | 48 | A | No |
| 24 | Masisi | 48 | A | No |
| 25 | Tshamutavha | 48 | A | No |
| 26 | Domboni | 51 | A | Yes |
| 27 | Mbodi | 52 | A | No |
| 28 | Helula | 54 | A | Yes |
| 29 | Tshikuyu | 55 | A | No |
| 30 | Tshitandani | 61 | A | Yes |
| 31 | Dovho | 68 | A | Yes |
| 32 | Mukomawabane | 69 | A | No |
| 33 | Galavhani | 69 | A | Yes |
| 34 | Matavhela | 73 | A | Yes |

| | | | | |
|---|---|---|---|---|
| 35 | Gundani | 75 | A | No |
| 36 | Mushithe | 75 | A | Yes |
| 37 | Tshivhungweni | 75 | A | Yes |
| 38 | Tshenzhelani | 76 | A | No |
| 39 | Mutele | 80 | A | No |
| 40 | Mabulo | 84 | A | No |
| 41 | Lamvi | 87 | A | Yes |
| 42 | Musanda | 87 | A | Yes |
| 43 | Makwilidza | 87 | A | Yes |
| 44 | Tshitambe | 88 | A | No |
| 45 | Ha-Mabila | 93 | B | No |
| 46 | Mavhuwa | 93 | B | No |
| 47 | Thongani | 95 | B | Yes |
| 48 | Makunya | 96 | B | No |
| 49 | Dambale | 96 | B | No |
| 50 | Mbodi Tsha Fhasi | 101 | B | Yes |
| 51 | Muraluwe | 102 | B | No |
| 52 | Gumela | 103 | B | No |
| 53 | Thondoni | 105 | B | Yes |
| 54 | Guyuni | 106 | B | Yes |
| 55 | Mukomawabane | 107 | B | No |
| 56 | Dzamba | 108 | B | No |
| 57 | Ha-Matsheketsheke | 108 | B | Yes |
| 58 | Rambada SP | 109 | B | Yes |
| 59 | Mutale | 109 | B | No |
| 60 | Khavhambe | 110 | B | No |
| 61 | Muswodi | 110 | B | Yes |
| 62 | Fefe | 111 | B | No |
| 63 | Bende Mutale | 112 | B | Yes |
| 64 | Sigonde | 112 | B | No |
| 65 | Travenna | 114 | B | Yes |
| 66 | Guyuni | 115 | B | Yes |
| 67 | Tshixwadya | 117 | B | Yes |
| 68 | Tshiungani | 117 | B | Yes |
| 69 | Lugisani | 118 | B | Yes |
| 70 | Tshihlavulu | 119 | B | No |
| 71 | Maramanzhi | 122 | B | No |
| 72 | Mavhode | 126 | B | No |

| | | | | |
|---|---|---|---|---|
| 73 | Mafukani | 126 | B | No |
| 74 | Makavhini | 127 | B | Yes |
| 75 | Nyala Magnesium Mine | 127 | B | No |
| 76 | Thengwe SP | 129 | B | No |
| 77 | Gumbu | 129 | B | No |
| 78 | Tshipale | 129 | B | Yes |
| 79 | Ngalavhani | 132 | B | Yes |
| 80 | Bashasha | 133 | B | Yes |
| 81 | Maheni | 135 | B | No |
| 82 | Khavhambe | 138 | B | No |
| 83 | Tshithuthuni | 139 | B | No |
| 84 | Mapakoni | 142 | C | No |
| 85 | Makuya SP | 145 | C | Yes |
| 86 | Maseha | 152 | C | No |
| 87 | Tshanzhe | 159 | C | Yes |
| 88 | Maseha | 159 | C | Yes |
| 89 | Gombani | 160 | C | Yes |
| 90 | Mukovhawabale | 165 | C | Yes |
| 91 | Lugisani | 168 | C | Yes |
| 92 | Tshamulumbwi | 169 | C | No |
| 93 | Mufulwi | 178 | C | No |
| 94 | Tshikondeni Mine SP | 178 | C | Yes |
| 95 | Sheshe | 179 | C | No |
| 96 | Hamakuya | 188 | C | Yes |
| 97 | Bale | 191 | C | Yes |
| 98 | Gogogo | 197 | C | No |
| 99 | Rambuda | 197 | C | No |
| 100 | Domboni | 202 | C | Yes |
| 101 | Mutele | 207 | C | No |
| 102 | Madangani | 207 | C | No |
| 103 | Muswoditshisimani | 210 | C | No |
| 104 | Lukau | 221 | C | No |
| 105 | Madzivhanani | 235 | C | No |
| 106 | Matshena | 238 | C | No |
| 107 | Luheni | 239 | C | Yes |
| 108 | Mapuloni | 245 | C | No |
| 109 | Tshikundamalema SP | 260 | C | Yes |
| 110 | Tshipise | 266 | C | No |

| | | | | |
|---|---|---|---|---|
| 111 | Mataulu | 273 | C | Yes |
| 112 | Tshibvumo | 274 | C | No |
| 113 | Mangaya | 276 | C | No |
| 114 | Pile | 319 | C | No |
| 115 | Vuvha | 337 | C | Yes |
| 116 | Mutshavhawe | 374 | C | No |
| 117 | Tshilamba | 382 | C | No |
| 118 | Shakadza | 388 | C | Yes |
| 119 | Muswodi Dipeni | 420 | C | No |
| 120 | Tshaphasha | 428 | C | No |
| 121 | Mulodi | 573 | C | Yes |
| 122 | Thengwe | 619 | C | No |
| 123 | Folovhodwe | 646 | C | Yes |
| 124 | Tshandama | 710 | C | Yes |
| | Total | 17818 | | |

## *Appendix C*

**UNIVERSITY OF LIMPOPO (Medunsa Campus) CONSENT FORM**

**Statement concerning participation in a Research Project*.**

Name of Project

**Investigation of availability, accessibility and affordability of optometric services in rural Mutale Municipality of Thulamela District in Limpopo Province of South Africa.**

I have read or heard the information on the aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I understand that participation in this Project is completely voluntary and that I may withdraw from it at any time and without supplying reasons. This will have no influence on the regular treatment that holds for my condition neither will it influence the care that I receive from my regular optometrist.

I know that this Project has been approved by the Research, Ethics and Publications Committee of Faculty of Medicine, University of Limpopo (Medunsa Campus). I am fully aware that the results of this Project* will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this Project.

..... .....

Name of patient/volunteer Signature of patient or guardian.

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

Place. Date. Witness

---

**Statement by the Researcher**

I provided verbal and/or written information regarding this Project.
I agree to answer any future questions concerning the Project as best as I am able. I will adhere to the approved protocol.

Lufuno Godfrey Thivhafuni ..... .....

Name of Researcher Signature Date Place

## *Appendix D*

**Application form for proposed Research Project**

**APPLICATION FORM FOR PROPOSED RESEARCH PROJECT UNIVERSITY OF LIMPOPO Medunsa Campus**

**MEDUNSA CAMPUS RESEARCH ETHICS COMMITTEE**

A. **PARTICULARS OF APPLICANT/CHIEF RESEARCHER**

Title: **Mr** First name: **Lufuno Godfrey** Surname: **Thivhafuni**

Department: **Public Health** Tel: **015 2683507**

School: **Public Health**

B. **DETAILS OF RESEARCH PROJECT**
(Tick appropriate block(s) with a 'x'

| | | | | |
|---|---|---|---|---|
| 1.a | New project | [ ] | or : Continuation of project | [ ] |
| 1.b | Independent research : | [ ] | or : Contract research: | [ ] |
| | Post-graduate research: | [X] | or : Undergraduate research : | [ ] |

Degree (specify) Master of Public Health

At which university is the degree registered? University of Limpopo ( Turfloop Campus)

2.a. Title of project: Investigation of availability, accessibility and affordability of optometric services the rural Mutale Municipality, Thulamela District, Limpopo Province.

b. Co-workers (Not for post-graduate research. See Guidelines)

| Name | Department/Institution | Signature |
|---|---|---|
| Not Applicable | | |
| | | |

c. Research Co-ordinator (In the case of independent or contract research)

| Name | Department/Institution | Signature |
|---|---|---|
| Not Applicable | | |

d. Supervisor (In the case of post-graduate research)

| Name | Department/Institution | Signature |
|---|---|---|
| Prof AO Oduntan | Optometry Dept, University of Limpopo, Turfloop Campus | |

e. Co-supervisor (In the case of post-graduate research)

| Name | Department/Institution | Signature |
|---|---|---|
| Dr MBL Mpolokeng | Public Health Dept, University of Limpopo, Turfloop Campus | |

Hospital Superintendent/Health Care Manager

| Name | Department/Institution | Signature |
|---|---|---|
| Not Applicable | | |

g. Other involved departmental heads

| Name | Department/Institution | Signature |
|---|---|---|
| Not Applicable | | |
| | | |

C. **SPECIAL REQUIREMENTS**

Will the research involve the following:

| | Yes | No | | Yes | No |
|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Experimental animals | | X | Approval from Animal ethics Committee attached (separate application form required) | | | |
| Special apparatus | | X | Is it available at Medunsa? | | | |
| Special drugs (medicaments) | | X | Explanation of who will supply the drugs attached | | | |
| Radio isotopes | | X | Completed radio Isotopes form attached (Appendix 4) | | | |
| Special laboratory facilities | | X | Is it available at Medunsa?<br>If no, attach a statement of requirements | | | |
| Electron microscopy | | X | Completed Electron microscope form attached (Appendix 3) | | | |
| Health care services | | X | Signature of health care manager attached | | | |
| Statistical analysis | X | | Has a statistician been consulted?<br>If yes, attach form. (Appendix 2) If no explain. | X | | |

## D. ETHICAL ISSUES

### 1. *Indemnity*

If a hospital (human, dental or veterinary) will be involved, please attach the written approval of the Superintendent. Should the use of the service laboratories be required, attached a letter of consent of the hospital management that this is in order. (**Not Applicable**)

### 2. *Consent*

Will patients/human volunteers form part of the survey? If so, kindly modify the attached form, specifically for your project. (Appendix 1)

## E. BUDGET

Who will finance this project? (Tick appropriate block with a "x")

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| University of Limpopo (Medunsa Campus) | | Health Department | | Self | X | Other (specify) | |
| | | | | | | | |

Please indicate the institutions where application has been made for financial support or where it is intended to apply for financial support.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MRC | | NRF | | CSD | | Other (specify) | |
| | | | | | | | |

NB: Approval of the research project does **NOT** imply that the requested funds will be made available to the applicant.

G. **DECLARATION BY RESEARCHER(S)**

Should this project be approved, I fully understand the conditions under which I am authorized to carry out the above-mentioned research. I guarantee to ensure compliance with these approved conditions. Furthermore, I undertake **not to change the procedure as detailed in the protocol but will submit a further application to the Research Committee if changes become necessary.**

**SIGNATURE: _____ DATE: _____**
**CHIEF RESEARCHER:**

**SIGNATURE:_____DATE:_____**
**HEAD OF DEPARTMENT**

**SIGNATURE:_____DATE:_____**
**DIRECTOR OF SCHOOL**

# UNIVERSITY OF LIMPOPO

## RECOMMENDATIONS REGARDING TITLE OF DISSERTATION/THESIS, SUPERVISOR

NAME OF STUDENT: **Thivhafuni LG**
STUDENT NO.: **8902452**
QUALIFICATIONS: **B. Optom.**

DEGREE & DISCIPLINE : **M. Optom. Optometry**

PROPOSED TITLE: **Availability, accessibility and affordability of optometric services in the rural Mutale Municipality, Thulamela District, Limpopo Province, South Africa.**

BRIEFLY OUTLINE OF STUDY:

A questionnaire will be used to collect information on Availability, accessibility and affordability of optometric services in the rural areas of Mutale Municipality, Thulamela District, Limpopo Province, South Africa. Subjects will 2250 adults of both genders residing in the rural areas of the Municipality. Analysis will be done using descriptive statistics.

| SUPERVISOR | CO-SUPERVISOR |
|---|---|
| **NAME**: AO Oduntan | MB Mpolokeng |
| **QUALIFICATIONS:** PhD | MD MPH |
| **PRESENT POST:** Professor | HOD, MPH |

**INSTITUTION**: University of Limpopo, Turfloop Campus, Sovenga.

_____ _____ _____ _____

**Head of Department** **Date** **Director** **Date**

Signature:

_____

**Caretaker Executive Dean:**
Faculty of Health Sciences

**Decision of E.C.S:** _____ **Date:** _____ **Ref:** _____

**Decision of Senate:** _____ **Date:** _____ **Ref:** _____

**REG. 0.5 (M & D)**

# UNIVERSITY OF LIMPOPO

## REGISTRATION FOR MASTERS AND DOCTORS DEGREE

CONTEMPLATED DEGREE : **MPH**
FACULTY: **Health Scieces**
SCHOOL: **Public Health**
FIELD OF STUDY: **MPH**
1. NAME: **Thivhafuni LG**

2. STUDENT NO.: **8902452**

3. PARTICULARS REGARDING HONOURSAND/OR MASTERS DEGREES ALREADY OBTAINED:

4. NAME OF HONOURS DEGREES AND UNIVERSITY: **B. Optom**
DURATION OF STUDY: **4 Years**
SUBJECT IN WHICH DEGREE WAS OBTAINED: **Optometry**

SYMBOL OR PERCENTAGE OBTAINED: **65%**

**RECOMMENDATION BY DIRECTOR OF SCHOOL**

Accepted/Not accepted: _____

Remarks: _____

Proposed Supervisor: _____

SIGNATURE: _____ DATE: _____

**RECOMMENDATION BY DEAN**: _____

Accepted/Not accepted: _____

_____

SIGNATURE: _____

Remarks: _____

## Appendix G

**Categorical Variables Coding for the logistic regression.**

| Variables | Frequency | Parameter coding | | |
|---|---|---|---|---|
| | | (1) | (2) | (3) |
| A5:Monthly Income of Household | Less than R1200 | 1 | 0 | 0 |
| | R1201 – R3000 | 0 | 1 | 0 |
| | R3001 – R5000 | 0 | 0 | 1 |
| | More than R5000 | Reference Category | | |
| A4.1:Employment Status of household head | Employed | 1 | | |
| | Unemployed | Reference Category | | |
| A2:Gender of household head | Male | 1 | | |
| | Female | Reference Category | | |

## Appendix H Variables in the Logistic regression Equation for "Affordability 1".

| Variable | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| Age of Household Head | -.023 | .013 | 3.062 | 1 | .080 | .978 |
| Male Household Head | .393 | .305 | 1.66 | 1 | .197 | 1.481 |
| Number of household members over 65 years | .030 | .220 | .019 | 1 | .892 | 1.030 |
| **Number of household members 16 - 75 years** | **-.426** | **.106** | **16.01** | **1** | **.000** | **.653** |
| Number of household members 6 - 15 years | -.187 | .128 | 2.14 | 1 | .143 | .829 |
| Number of household members 5 years and below | -.018 | .191 | .008 | 1 | .927 | .983 |
| Household Head Employed | .131 | .388 | .11 | 1 | .736 | 1.140 |
| **Monthly Household Income** | | | **22.51** | **3** | **.000** | |
| Up to R1200.00 | -2.711 | .598 | 20.52 | 1 | .000 | .066 |
| R1201.00 - R3000.00 | -1.835 | .567 | 10.48 | 1 | .001 | .160 |
| R3001.00 -R5000.00 | -1.194 | .604 | 3.91 | 1 | .048 | .303 |
| Constant | 5.069 | .971 | 27.24 | 1 | .000 | 159.048 |

**Appendix I Variables in the Logistic Regression Equation for "Affordability 2"**

| Variables | B | S.E. | Wald | Df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| **Age of Household Head** | **-.033** | **.016** | **4.114** | **1** | **.043** | **.968** |
| Male Household Head | .027 | .341 | .006 | 1 | .937 | 1.028 |
| Household Head Employed | 1.032 | .865 | 1.426 | 1 | .232 | 2.808 |
| Monthly Household Income | | | 2.865 | 3 | .413 | |
| Up to R1200.00 | -.302 | .654 | .214 | 1 | .644 | .739 |
| R1201.00 - R3000.00 | .506 | .414 | 1.489 | 1 | .222 | 1.658 |
| R3001.00 -R5000.00 | -.163 | .448 | .132 | 1 | .717 | .850 |
| **Household Size** | **-.157** | **.073** | **4.597** | **1** | **.032** | **.855** |
| Constant | .986 | 1.253 | .620 | 1 | .431 | 2.681 |