MAGNITUDE AND CAUSES OF LOW VISION IN ADULTS ATTENDING THE EYE CLINIC AT MUHIMBILI NATIONAL HOSPITAL

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MAGNITUDE AND CAUSES OF LOW VISION IN ADULTS ATTENDING THE EYE CLINIC AT MUHIMBILI NATIONAL HOSPITAL

By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for

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Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for submission a dissertation titled: **"Magnitude and causes of low vision in adults attending the eye Clinic at Muhimbili National Hospital**, in partial fulfillment of the requirements for the degree of Master of Medicine (Ophthalmology) of the Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, **Dr Sonia JayantVaitha**, hereby declare that this is my original work and that it has not been presented nor will it be presented to any other University for a similar or any other degree award.

Signature…….. Date……

Dr. Sonia JayantVaitha

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DEDICATION

I dedicate this work to my Parents Mr.JayantVaitha and Mrs.BhartiVaitha, for their endless support, love and care.

ABSTRACT

Background: Globally, in 2006, World Health Organization (WHO) estimated that there were 314million visually impaired people in the world, 153 million of them being due to uncorrected refractive error. At least 45 million working adults aged between 16-49 years were affected globally.[1]According to the WHO low vision is visual acuity of less than 6/18 but equal to or more than3/60 in the better eye with best possible correction or with significant visual field loss (corresponding visual field loss of less than 20 degrees)[2]. A person with low vision has some residual useful vision, with the potential for enhancement of functional vision if they receive appropriate low vision care services.Several studies have been done on low vision in other countries; the available literature reveal that the studies done in Tanzania were mostly among children, there is no study on low vision which has been done among adults.

Objective: To determine the magnitude and causes of low vision in adults attending theeye clinic at Muhimbili National Hospital, Dar es salaam Tanzania.

Methodology:A cross-sectional study was conducted between April and September, 2011. A total of 561 patients who attended the general eye clinic at Muhimbili National Hospital were thoroughly assessed and treated by ophthalmologists and refractionists. One hundred patients whose vision did not improve to 6/18 and above after surgical, medical and optical treatment were referred to the low vision clinic. These 100 patients were enrolled in the study and complete low vision assessment was done. Data were entered in computer and analyzed using SPSS version 13.

Results: Among 561 patients, there were 100(17.83%) patients with low vision. The highest proportion (10.3) of low vision patients was found among the age

group of 18-27 years age, and a gradual trend of decrease in low vision patients with increasing age (0.2% in eldest age group of 78-87 years) was observed. Optic neuropathy was the predominant cause of low vision (47%) in the study population, followed by ARMD (9%), Retinitis pigmentosa (7%), glaucoma (7%), albinism (7%), amblyopia (7%), corneal diseases (5%), refractive errors (4%), diabetic retinopathy (4%) and macular scars (3%).

Conclusion: The magnitude of Low vision is high among adults attending the eye clinic at Muhimbili National Hospital, with younger patients being affected more than older ones. Most causes are either treatable or preventable.

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CHAPTER ONE

1. INTRODUCTION

Globally, in 2006, the World Health Organization (WHO) estimated that there were 314million visually impaired people in the world, 153million of them being due to uncorrected refractive error. At least 45 million working adults aged between 16-49 years were affected globally.[1]

According to the WHO, low vision is a visual acuity of less than 6/18 but equal to or more than3/60 in the better eye with best possible correction or with a significant visual field loss (corresponding visual field loss to less than 20 degrees)[2].Low vision means that even with regular glasses, contact lenses, medicine, or surgery, people find everyday tasks difficult to do. Reading the mail, shopping, cooking, watching the TV and writing can seem challenging. Unlike a person who is blind, a person with low vision has some residual useful vision, with the potential for enhancement of functional vision if they receive appropriate low vision care services.However, low vision usually interferes with the performance of daily activities, such as reading or driving.

Low vision is further classified into the following categories:[3]

- Moderate low vision: corrected vision in the better eye < 6/18 – 6/60
- Severe low vision: corrected vision in the better eye <6/60 – 3/60

Low vision is a major cause of morbidity and has profound effects on the quality of life for many people as it inhibits or reduces mobility and economical well being of the affected individuals and their families.

Many low vision patients are old and frequently relatively immobile so that the retention of some ability to read is of vital importance to their happiness. Residual vision is also important for leisure activities involving near work. In addition there are many other activities which may need to be considered like signing cheques, reading, recognizing paper money and coinage, playing cards, cooking and consuming food. Recognizing distant objects and faces and watching TV are other important activities that require good vision.

Worldwide for each blind person, there are 3 people who have low vision, with a country and regional variation ranging from 2 to 5 people.[4]

Some of the common diseaseswhich may cause low vision are age related macular degeneration, untreatedcataracts, glaucoma, uveitis, corneal scarring (can be due to various causes e.g. cornel ulcer, ocular injury, trachoma), Diabetic retinopathy, uncorrected refractive errors, Stargardt's disease, albinism, retinitis pigmentosa, amblyopia, cortical visual impairment and optic nerve diseases.[5]

Several studies have been done on low vision in other countries. The available literature reveals that the studies done in Tanzania were mostly among children. There are no studies on low vision among adults in Tanzania. Low vision seems to be a big problem as many patients attend low vision clinic at MNH which started only a few years back and which provides low vision services. Besides the lack of low vision clinics,the magnitude and causes of low vision in adults is not known. The aim of the study was to determine the magnitude and causes of low vision among adults attending MNH eye clinic. Results of this study would be used for planning appropriate interventions for prevention and management of avoidable causes of low vision inthe country.

1.2 REVIEW OF LITERATURE

1.2.1 Magnitude of low vision

In 2006, WHO estimated that there were 314million visually impaired people in the world, 153million of them being due to uncorrected refractive error. At least 45 million working adults aged between 16-49 years were affected globally.[1]

The magnitude of blindness and low vision varies from country to country and from place to place within one country. The prevalence of low vision and blindness by WHO sub regions, using WHO visual acuity definitions (%) is shown in table 1;

Table 1: Magnitude of Low Vision and Blindness by WHO sub region [6]

WHO subregion	Blindness (VA < 3/60)				Low vision (3/60 ≤ VA < 6/18)			
	All ages	<15 years	15-49 years	50+ years	All ages	<15 years	15-49 years	50+ years
AFR-D	1.00	0.12	0.20	9.00	3.00	0.37	0.60	27.00
AFR-E	1.00	0.12	0.20	9.00	3.00	0.37	0.60	27.00
AMR-A	0.20	0.03	0.10	0.40	1.20	0.18	0.60	2.40
AMR-B	0.30	0.06	0.15	1.30	1.70	0.35	0.85	7.37
AMR-D	0.50	0.06	0.20	2.60	2.00	0.25	0.80	10.40
EMR-B	0.80	0.08	0.15	5.60	2.50	0.25	0.47	17.50
EMR-D	0.97	0.08	0.20	7.00	2.90	0.24	0.60	20.93
EUR-A	0.20	0.03	0.10	0.50	1.30	0.20	0.65	3.25
EUR-B1	0.40	0.05	0.15	1.20	1.50	0.19	0.56	4.50
EUR-B2	0.30	0.05	0.15	1.30	1.10	0.19	0.55	4.77
EUR-C	0.40	0.05	0.15	1.20	1.80	0.23	0.68	5.40
SEAR-B	1.00	0.08	0.15	6.30	2.40	0.20	0.36	15.12
SEAR-D	0.60	0.08	0.20	3.40	2.00	0.27	0.67	11.33
WPR-A1	0.30	0.03	0.10	0.60	1.20	0.12	0.40	2.40
WPR-A2	0.30	0.03	0.10	0.60	1.20	0.12	0.40	2.40
WPR-B1	0.60	0.05	0.15	2.30	1.90	0.16	0.48	7.28
WPR-B2	0.80	0.08	0.15	5.60	1.90	0.20	0.36	13.30
WPR-B3	0.30	0.08	0.15	2.20	1.20	0.33	0.60	8.80

Studies in different countries have given different prevalences. A study done in United States to determine causes and prevalence of visual impairment among adults concluded that low vision affected approximately1 in 28 Americans older than 40 years. According to that study, it was expected that the prevalence of visual disabilities would increasemarkedly during the next 20 years, owing largely to the agingof the US population.[7]A similar study conducted in Canada found out a prevalence of low vision of 0.4% (35.6 per10, 000 individuals).[8]

In Australia, based on combined data from the Melbourne Visual Impairment Project (MVIP) 1992–1996 and the Blue Mountains Eye Study (BMES), 1992–1994, it was estimated that there were 56,100 (1.2%) blind and 388,300 (8.2%) people having low vision.[9]

Several studies have been conducted among Asian countries. A study to describe the prevalence and causes of low vision and blindness in a rural population in Northern China revealed a prevalence of blindness of 0.5% and that of bilateral low vision of 1.0% for persons 30 years of age and older.[10]In Malaysia, the 1996 National Eye Survey showed that the age adjusted prevalence of bilateral blindness and low vision was 0.29% (95% CI 0.19 to 0.39%), and 2.44% (95% CI 2.18 to 2.69%) respectively.[11]

A study done in Pakistan to determine prevalence and causes of functional low vision (FLV) revealed that the standardized prevalence of FLV and total blindness were 1.7% (95% CI: 1.5%–1.9%) and 0.2% (95% CI: 0.1%– 0.2%), respectively.[12]

Studies in African countries have reported prevalences of low vision of 3.2% (Nigeria)[13], 0.32% (South Africa 1995)[14], 3.7% in Ethiopia[15], and 12.1% in adults in Gurage Zone, central Ethiopia.[16] Studies done in East Africa, revealed the prevalence of low vision in southern Sudan to be 7.7%[17], and that in Kenya was 2.5%.[18]

Few studies on low vision have been done in Tanzania. A prevalence of 4.9% low vision was obtained in a community based study to determine the prevalence and causes of blindness in a trachoma endemic area of Ruangwa district of Tanzania.[19]

1.2.2 Causes of low vision:

There are multiple causes of low vision:

Macular degeneration is a medical condition which usually affects older adults that result in loss of vision in the center of the visual field (the macula) because of damage to the retina. It occurs in a “dry” and “wet” forms. It is a major cause of visual impairment in older adults (>50 years).Macular degeneration leads to loss of central vision, although enough peripheral vision remains. The loss of central vision profoundly affects visual functioning. It is not possible, for example, to read without central vision. There is a loss of contrast sensitivity, so that contours, shadows, and colour vision are less vivid.[20,21]

A cataract is a clouding in the crystalline lens of the eye or in its capsule, varying in degree from slight to complete opacity and obstructing the passage of light. Cataracts typically progress slowly to cause visual loss and are potentially blinding if untreated. The condition usually affects both eyes, but almost always one eye is affected earlier than the other. Visual loss due to cataracts is treatable and many patients attain normal vision after treatment. Untreated cataracts are an important cause of low vision in both developed and developing countries.[22]

Glaucoma is an eye disorder in which the optic nerve suffers damage. It is often, but not always, associated with increased intraocular pressure. Untreated glaucoma leads to permanent damage of the optic nerve and resultant visual field loss, which can progress to low vision and blindness.[23]

Uveitis is inflammation of the uveal tissues. Uveitis may cause blurry and reduced vision. When treated, vision may recover. In some cases, mostly in intermediate uveitis, posterior uveitis and panuveitis, where inflammation is recurrent and chronic, damage to the eye can occur, particularly to the retina

and optic nerve, and cause permanent visual loss. Factors responsible for loss of vision include complicated cataract, cystoid macular edema, secondary glaucoma, vitreous haziness and retinal detachment as a complication of posterior uveitis and panuveitis.[24]

Diabetic retinopathy is a microangiopathy caused by complications of diabetes mellitus in the retina, which can eventually lead to low vision. Diabetic retinopathy is the result of microvascular retinal changes. Hyperglycemia induced intramural pericyte death and thickening of the basement membrane lead to incompetence of the vascular walls. These damages change the formation of the blood-retinal barrier and also make the retinal blood vessels more permeable. The micro-vascular changes lead to diabetic retinopathy with its complications such as persistent vitreous hemorrhage, tractional retinal detachment and neovascular glaucoma. All these will lead to Low vision and eventually blindness.[25] Macular edema, or retinal thickening, is an important manifestation of Non proliferative diabetic diabetic retinopathy and represents the leading cause of low vision and legal blindness in diabetics.[26]

Retinitis pigmentosa (RP) is an inherited progressive retinal dystrophy, in which abnormalities of the photoreceptors (rods and cones) or the retinal pigment epithelium (RPE) of the retina lead to progressive visual loss. Affected individuals first experience defective dark adaptation or nyctalopia (night blindness), followed by reduction of the peripheral visual field and sometimes, loss of central vision late in the course of the disease.[27]

Albinism (also called achromia, achromasia, or achromatosis) is a congenital disorder characterized by the complete or partial absence of pigment in the skin, hair and eyes due to absence or defect of an enzyme involved in the production of melanin. Albinism results from inheritance of recessive genealleles and is

known to affect all vertebrates, including humans. Albinism is associated with a number of visual defects, such as photophobia, nystagmus and astigmatism.

Development of the optical system is highly dependent on the presence of melanin, and the reduction or absence of this pigment in albinistic individuals may lead to

- Misrouting of the retinogeniculate projections, resulting in abnormal decussation (crossing) of optic nerve fibers.
- Photophobia and decreased visual acuity due to light scattering within the eye.
- Reduced visual acuity due to foveal hypoplasia and possibly light-induced retinal damage.

Some of the visual problems associated with albinism arise from a poorly developed retinal pigment epithelium (RPE) due to the lack of melanin. This degenerate RPE causes fovea hyperplasia which results in eccentric fixation and lower visual acuity. It also causes excessive light to enter the eye leading to glare.[28]

Cortical visual impairment (CVI) is also sometimes known as Cortical Blindness, although most people with CVI are not totally blind. Though the vision of a person with CVI may change, it rarely if ever becomes totally normal.[29]

Uncorrected refractive errors e.g. myopia, hypermetropia and astigmatism affect large proportion of the population worldwide. They can be easily diagnosed, measured and corrected with spectacles or other refractive corrections to attain normal vision. If they are not corrected or the correction is inadequate, refractive errors become major cause of low vision and even blindness.[30]

The causes low vision vary widely in different parts of the world and even within the same country, being largely determined by socioeconomic development, and the availability of primary health care and eye care services.

Worldwide, cataract is the most common cause of blindness and low vision among adults and elderly. Infectious diseases such as trachoma and onchocerciasis resulting in low vision and blindness are peculiar to Africa, Asia and South America.[15]On the other hand the major causes of low vision in developed countries are age-related macular degeneration and diabetic retinopathy, that are difficult to prevent and to manage.

In United States, cataracts, diabetic retinopathy, glaucoma, and advanced age-related macular degeneration (AMD) are the most common causes of low vision and related complications among adults aged 40 years and older.[31] A similar study in Canada revealed cataract (29.9%), macular degeneration (13%) and diseases of visual pathways (12%) were the main causes of low vision.[8]

Among Asian countries, China and Malaysia, uncorrected refractive error was the predominant cause of presenting low vision. The main causes of low vision in China were refractive errors (78.4%), however, after refractive correction,cataract became the leading cause of low vision (48.2%). Diabetic retinopathy (16.1%), glaucoma (9.7%), and corneal opacity (9.7%) were other common causes of blindness defined using best corrected visual acuity(BCVA).[10] Low vision causes in Malaysia were uncorrected refractive errors (48%), followed by cataract (35.93%). Of the 514 people with low vision in Malaysia, 442 (85.99%) had preventable or treatable causes comprising 223 cataract, 208 uncorrected refractive errors, 5 uncorrected aphakia, and 6 diabetic retinopathy.[11]

In a study in Pakistan, just over one third (34.4%) of low vision was due to corneal opacities. Other causes were retinal conditions, amblyopia, phthisis bulbi, glaucoma and optic atrophy. The main cause of low vision in North West frontier province (NWFP) and Baluchistan was retinal conditions (47.8% and 33.3%, respectively), whereas in Punjab and Sindh the main cause was corneal disease, mainly scarring (38.8% and 33.3%, respectively). There were significant differences between rural and urban areas. Retinal disease predominated in urban areas (39.8% vs. 26.5%), whereas corneal opacity was the commonest cause in rural areas (38.0% vs.25.5%). Optic atrophy was the leading cause of low vision in 30 to 39-year-olds (28%), but was less important in older age groups.[12] The main causes of low vision in Bangladesh in one study were cataract (74.2%), refractive error (18.7%), and macular degeneration (1.9%).[32]

The causes of low vision in other developing countries including those in sub-Saharan Africa differ with corneal scarring and glaucoma being the main causes of low vision after cataract.Trachoma and onchocerciasis may be the second or third cause of low vision in some countries where these infectious diseases are endemic.[33]

A Study in the central region of the Limpopo Province of South Africa reported the main causes of low vision to be cataract, corneal opacities and glaucoma. Other causes were hypertensive retinopathy, diabetic retinopathy, and trauma.[14]

In Ethiopia, causes of low vision were found to be as follows: cataract (42.3%), refractive error (33.4%), trachomatous corneal opacity (7.7%), other corneal opacity (5.9%), macular degeneration 4.6%, others 6.1%.[16] The main cause of low vision in Sudan was trachoma (58.1%) and cataract (29.3%).[17]

Another survey showed that in Nigeria, the major causes of low vision were glaucoma (19.8%), aphakia / unoperable cataract (8.9%), maculopathy(8.8%) and 12.13% were of unspecified diagnosis.[34]

1.2.3 Prevalence of low vision and demographic features:

The prevalence of low vision varies in different people according to their age, sex, education, socioeconomic status, and race.

In America, it was seen that the age-adjusted prevalenceof low vision was significantly higher for women among whitepersons (P = .01) but did not differ significantly by genderamong black (P = .96) or Hispanic persons (P = .11). It also showed that both low vision and blindness increased significantly with agefor all races/ethnicities (P<.001).[7]

In a study done in Bangladesh the age specific blindness and low vision prevalence was found to be greater with increased age. Blindness and low vision was also found to be more prevalent among those living in rural areas of Bangladesh as compared to urban areas like Dhaka, and in economically disadvantaged people, as well as in women and illiterate subjects.[32]

Similar findings were obtained in a study done in Ethiopia, whereby the prevalence of low vision and blindness was higher in females as compared to males and in rural residents. Authors concluded that although age is a biological risk factor for blindness and low vision, the gender and residency differentials reflect on the social inequalities relating in accessing health services that leaves females and rural residents at a disadvantage.[15]

1.3. PROBLEM STATEMENT

Unlike a person who is blind, a person with low vision has some residual useful vision, with the potential for enhancement of functional vision if they receive appropriate low vision care services. Ironically, low vision is a condition that has not received its due share of attention. The coverage of low vision care and the uptake of services where available, have remained low. The coverage has been almost negligible in developing countries. This shortage is partly due to a lack of awareness about the importance of low vision services among professional groups involved in the delivery of eye care. The consequences associated with uncorrected low vision affect the functional, psychological, socio-economic and quality of life implications of the people with low vision.

Worldwide there are currently 45 million people and an additional 135 million with significant visual impairment or low vision, and 90% of the world's visually impaired live in the developing world. The evidence suggests that these numbers are growing at an alarming rate. Many reasons have been identified for the rising tide of blindness and low vision, prominently among them being the increase of the world's elderly population, particularly in developing countries.

Studies have been done on low vision in children but not in adults in Tanzania. Besides the lack of low vision clinics, nothing is known on the magnitude and causes of low vision in adults because studies have not been conducted in this age group. Knowing the magnitude and causes of low vision among adults attending the eye clinic at MNH is important for planning purposes.

1.4. RATIONALE

The study was expected to provide baseline data on magnitude and causes of low vision among adult patients attending the Muhimbili National Hospital, the only public facility where low vision services are provided to both children and adults in Tanzania. Results of this study would be used for planning appropriate interventions for prevention and management of avoidable causes of low vision in the country.

1.5. OBJECTIVES:

1.5.1. Broad Objective

To determine the magnitude and causes of low vision among adults attending the eye clinic at Muhimbili National Hospital.

1.5.2. Specific Objectives

1. To determine the magnitude of low vision among adult patients attending the eye clinic at Muhimbili National Hospital (MNH).

2. To determine causes of low vision in adult patients attending the low vision eye clinic, at MNH.

3. To determine the demographic features: age, gender and occupation, among adults with low vision attending the eye clinic at MNH.

4. To determine the types of low vision devices prescribed to adult patients attending the eye clinic at MNH.

CHAPTER TWO

2. METHODOLOGY

2.1. STUDY DESIGN

This was a hospital based cross sectional descriptive study.

2.2 STUDY AREA

The study was conducted in the Low vision clinic at Muhimbili National Hospital, Dar es Salaam, Tanzania.

Muhimbili National hospital is situated in the middle of Dar es Salaam city in Tanzania. Dar esSalaam is inhabited by 4 million people while the country's population is above 35 million. Being a tertiary hospital, MNH provides services to inpatients as well as outpatients from all over the country.MNH is also a teaching hospital for the Muhimbili University of Health and Allied Sciences. It is the only government hospital providing a specialized low vision services in Tanzania.

Muhimbili Low vision clinic is part of the ophthalmology department at MNH. Since 2009 the clinic used to serve predominantly children with low vision, but from 2011, the clinic started to provide low vision services to both children and adults with low vision from neighboring regions of Morogoro, Coast, Zanzibar, Iringa and others like Kigoma and the rest of the country.

The clinic is conducted on Fridays from 8.00am to 3.00pm. Five to six patients are attended on every Friday. The patients are initially screened and examined thoroughly in the adult ophthalmology clinic by consultant ophthalmologists and optometrists, and then those who fall under the category of low vision are referred to the low vision clinic.

2.3. STUDY POPULATION

All adult patients attending the Low vision eye clinic atMuhimbili National Hospital during the study period.

2.4. SAMPLING AND SAMPLE SIZE

A convenient sampling technique was used where by all the adult patients attending low vision clinic during the study period time were included in the study.

Five to six patients attended low vision clinic every friday, therefore expected sample size was about 114 patients.

2.5. DURATION OF STUDY

The duration of study was from April to September 2011.

2.6. INCLUSION CRITERIA

All patients aged 18 years and above with visual acuity of less than 6/18 but equal to or greater than 3/60 in the better eye with best possible correction or those with significant visual field loss (corresponding visual field loss to less than 20 degrees).

2.7. EXCLUSION CRITERIA

1. Patients who had psychiatric problems.

2. Patients who did not consent to participate in the study.

3. Patients those are too sick.

2.8. PROCEDURES

In the general eye clinic, patients werethoroughlyassessed and treated by ophthalmologists and optometrists. Those patients thatdid not achievevisualacuitybetterthan 6/18 aftersurgical, medical or opticaltreatmentwerethusreferred to low vision clinic.

All adult patients whoattended the low vision clinicduring the studyperiodwereinformed about the study and informed consent was obtained from all patients before enrolment into the study.Objectives of the study were clearly explained to patients prior to commencing the study. Patients were allowed to withdraw from the study whenever they wished without endangering their treatment plan. Confidentiality was maintained during the examination of all patients and results of this study were solely used for the intended purpose.

A briefmedicalhistorywasobtained about theirvisualneeds, occupation and dailyactivities. A structured questionnaire wasused to record patients particulars, history and ocularexaminationfindings.

Ocular examination: Visual acuity (VA) wasassessedusingSnellenliterate and illitrate E chartswith and withoutpinhole. Patients whose VA wasless than 6/18 but better or equal to3/60 wereexaminedusing Log MAR chart and Sonskensilveracuity system chart. NearvisualacuitywasexaminedusingJaeggerschart. Patients werethenrefractedobjectivelyusinga retinoscope and subjectively to obtain best correctedvisualacuityboth for distance and for near.

Low vision assessment

Low vision assesmentwascarried out by the principal investigatorunder the supervision of alow vision specialistwhois the Optometristincharge of the Low vision clinic.

Magnification assessmentwasdoneusing areading stand and measuring tape.

Variousmagnifiers of differentpowers and of different types (eg; hand heldmagnifiers, stand magnifiers, etc. according to the patients needs).For distance, telescopes of differentpowerswereused, startingfromlow power

thengraduallyincreasing to higher power telescopes and the improvement in visualacuitywasrecorded.

2.9. DATA MANAGEMENT AND ANALYSIS

Data wereenteredintoa computer aftereverylow vision clinicday. Data wereanalysedusing SPSS VERSION 13. Frequency tables and cross tabulation wereused. CHI SQUARE test wasused to test for significance of findingswhereappropriate.

2.10. ETHICAL CLEARANCE

Ethical clearance to conduct this study was sought from the ethical Committee of MUHAS, and according to the Helsinki declaration of 1964, in which the patients were protected.Permission from the hospital management was sought. Informed consent was obtained from all patients before enrolment into the study.

CHAPTER THREE

3. RESULTS

During the study period, 561 new patients attended MNH general eye clinic. Among these, 100 patients had low vision and were referred to low vision clinic.

Thus the magnitude of low vision obtained among adult patients attending MNH eye clinic was 17.8%.

Table 1: The distribution of study population by age group:

	Low vision		
Age groups(years)	**Yes**	**No**	**Total**
18-27	58(10.3%)	87(15.5%)	145(25.85%)
28-37	15(2.7%)	60(11.6%)	75(20%)
38-47	10(1.8%)	75(13.4%)	85(15.15%)
48-57	8(1.4%)	79(14.1%)	87(15.51%)
58-67	5(0.9%)	67(11.9%)	72(12.83%)
68-77	3(0.5%)	56(9.9%)	59(10.52%)
78-87	1(0.2%)	37(6.6%)	38(6.77%)
Total	100(17.8%)	461(82.2%)	561(100%)

It was found that the highest percentage of low vision patients (10.3%) were from the youngest age group (18-27years) and there was a gradual trend of decrease in low vision patients with increasing age, lowest (0.2%) being in the eldest age group (78-87years).

Table 2: The distribution of study population according to gender:

	Low vision					
Gender	**Yes**		**No**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Male	55	21.8	197	78.2	252	44.9
Female	45	14.6	264	85.4	309	55.1
Total	100		461		561	100

There was noticeable difference between males and females. Low vision was seen more among males (21.8%) as compared to females (14.6%). The difference was statistically significant (P Value = 0.0323).

Table 3: Causes of low vision:

Causes	Frequency		
	M	**F**	**Total**
Optic neuropathy	24(51.0%)	23(48.9%)	47
ARMD	5(55.5%)	4(44.4%)	9
Retinitis pigmentosa	5(71.4%)	2(28.6%)	7
Glaucoma	5(71.4%)	2(28.6%)	7
Albinism	5(71.4%)	2(28.6%)	7
Macular scars	2(66.7%)	1(33.3%)	3
Corneal diseases	3(60%)	2(40%)	5
Refractive errors	3(75%)	1(25%)	4
Diabetic retinopathy	1(25%)	3(75%)	4
Amblyopia	2(28.6%)	5(71.4%)	7
Total	55	45	100

The commonest cause of low vision was optic neuropathy (47%), followed by Age related macular degeneration (9%).

Glaucoma, albinism, retinitis pigmentosa and amblyopia contributed equally in causing low vision(7%).

Table 4: The distribution of causes of low vision by age groups:

Causes of low vision	Age groups (years)							Total
	18-27	28-37	38-47	48-57	58-67	68-77	78-87	
Optic neuropathy	32	6	3	5	1	0	0	47
ARMD	0	2	0	1	3	2	1	9
Retinitis pigmentosa	3	0	4	0	0	0	0	7
Glaucoma	3	1	1	2	0	0	0	7
Albinism	5	2	0	0	0	0	0	7
Macular scars	1	1	1	0	0	0	0	3
Corneal diseases	5	0	0	0	0	0	0	5
Refractive errors	3	1	0	0	0	0	0	4
Diabetic retinopathy	0	1	1	0	1	1	0	4
Amblyopia	6	1	0	0	0	0	0	7
Total	58	15	10	8	5	3	1	100

The commonest cause of low vision was optic neuropathy. The highest proportion of optic neuropathy was found in youngest age group (18-27years) and the number gradually decreased with increasing age.

Table 5: Distribution of low vision according to occupation

Occupation	Frequency		Total
	M	F	
Employed	20(80%)	5(20%)	25
Unemployed	2(33.3%)	4(66.7%)	6
Student	33(47.8%)	36(52.2%)	69
Total	55	45	100

The highest proportion of low vision patients was among students (69%) and lowest among unemployed patients.

Table 6: Categories of low vision:

Low vision category	M	F	Total
Moderate (<6/18-6/60)	49(55%)	40(44.9%)	89
Severe (<6/60-3/60)	6(60%)	4(40%)	10
Profound (<3/60-1/60)	0(0%)	1(1%)	1
Total	55	45	100

Majority of the patients (89%) had moderate low vision according to WHO criteria, and 1% had profound low vision.

Table 7: The distribution of low vision devices prescribed to patients with low vision:

Type of low vision devices	M	F	Total
Telescopes only	11(52.3%)	10(47.6%)	21
Magnifiers only	6(85.7%)	1(14.29%)	7
Both	35(52.2%)	32(47.8%)	67
None	3(60%)	2(40%)	5
Total	55	45	100

Majority of the patients with Low vision (67%) found telescopes and magnifiers useful for distance and near vision, while only a small proportion (5%) of patients did not find low vision devices useful in improving their visual acuities.

Table 8: Improvement in distant visual acuity after low vision assessment and correction.

VA improvement	No.	%
1-3 lines	40	40
> 3 lines	48	48
No improvement	11	11
Total	100	100

Most of the patients (48%) improved to 3 lines after distant low vision assessment and correction. Few patients(11%) did not improve at all with distant low vision devices.

Improvement in near visual acuity after low vision assessment and correction:

The visual acuity for near improved up to N8-N12 in 62 patients who were prescribed magnifiers. Only 4% of the patients achieved less than N12.

Eight patients (8%) had good near visual acuity but they were prescribed magnifiers in order to improve their speed of reading and to achieve a comfortable reading distance.

Seventeen patients(17%) who had good pre-assessment near visual acuity with comfortable reading distance and good reading speed were not prescribed any low vision devices for near.

Nine patients (9%) did not improve with low vision devices for near.

CHAPTER FOUR

4. DISCUSSION

Low vision is defined by WHO as a visual acuity of less than 6/18 but equal to or more than 3/60 in the better eye with best possible correction or with a significant visual field loss (corresponding visual field loss to less than 20 degrees)[2].

Magnitude of low vision varies from country to country and from place to place within one country. The current study has revealed ahigh prevalence of 17.8%. This seems to be even higher than the prevalences reported by other studies done in other developing countries like Northern China (1.0%)[10],Pakistan (1.7%)[12], Nigeria (3.2%)[13],Gurage Zone in central Ethiopia (12.1%)[16] and Southern Sudan (7.7%)[17]. This can be explained by the fact that the current study was a hospital based study whereas the other studies were community based.

Previous studies from Africa, Asia and South America reported that infectious diseases such as trachoma and onchocercias were the commonest causes of low vision[14]and uncorrected refractive error was the predominant cause of low vision in China[10] and Malaysia[11]. Studies done in developed countries showed that age related macular degeneration and diabetic retinopathy were the major causes of low vision. The current study showed optic neuropathy to be the commonest cause of low vision. This could be explained by the fact that majority of low vision patients who sought low vision services were young patients who were mainly students. This is due to the fact that young patients, especially students have higher visual needs than elderly patients. Also, being young, these patients can easily and independently come to the hospital unlike old patients who are dependent on their families to bring them to hospital. The

percentage of old patients with low vision being lower can be due to problems concerning mobility and incomplete referral of old patients. Elderly patients come to eye clinic mostly with pathologies common in old individuals, for example cataracts and glaucoma which are managed in general eye clinic, and vision is restored. Unlike elderly patients, young patients who come to eye clinic with poor vision due to e.g.optic neuropathy, are treated for long time and those who do not achieve visual acuity better than 6/18 are referred to low vision clinic.

Optic neuropathy epidemics have affected tens of thousands of people around the world. In most cases poor nutrition or toxic dietary factors have played major role in underlying etiology. Tropical ataxic neuropathy in Nigeria[35] and a form of acute paralysis known as "Konzo" in Democratic Republic of Congo[36], Mozambique[37], and Tanzania[38] was associated with cyanide toxicity secondary to cassava consumption (although in the case of TAN, the link with cyanide intoxication is not well established). Previous reports from described bilateral, simultaneous, usually painless, visual failure over 2-12 weeks, loss of nerve fibers in the papillomacular bundle associated with central or cecocentralscotomas, impaired color vision, and peripheral neuropathy[39,40] similar to the findings in patients involved in current study. In our study, nutritional optic neuropathy seems to be unlikely in many patients as most of them gave a history of well balanced diet, although current treatment of B-vitamin supplementation based on its use in the Cuban epidemic [41] has proven very successful in acute cases in Tanzania (Dalmar et al, unpublished data, 2010).

Studies show HIV infection as a direct cause of optic neuropathy [42]in contrast to current study whereby patients with low vision due to optic neuropathy were screened for HIV and were found to be negative.

Reports from previous studies done both in developed countries like America[7]and developing countries like Bangladesh[32] showed that prevalence of low vision increased with increasing age. The current study showed that the prevalence of low vision was highest among young adults, this could be because majority of these patients were students thus having higher visual needs making them desperately seek help/low vision services. The prevalence of low vision was lowest among older age groups and this could be due to the way of thinking among these patients that the poor vision is merely due to normal ageing process and therefore not much can be done to treat it. Also, it can be due to difficulties in transport from home to hospital and their dependency on their family to bring them to hospital and support their treatment financially.

Studies done in America[7] showed that the age-adjusted prevalenceof low vision was significantly higher for women among whitepersons (P = .01) but did not differ significantly by genderamong black (P = .96) or Hispanic persons (P = .11). The current study showed that proportion of female patients attending the general eye clinic was higher than males, yet proportion of males with low vision was greater than in females. This could be due to females with low vision being more dependent on assistance to be brought to low vision eye clinic as compared to more independent males. In a study done in rural areas of Bangladesh the age specific prevalence of low vision was found to be greater among women.[32] Similarly in Ethiopia,[15]the prevalence of low vision was higher among females than in males. In the current study it was found that males with low vision were more than females even though Tanzania, Bangladesh and Ethiopia are all developing countries. This difference could be due to the fact that the current study was hospital based, therefore only those patients that get opportunity to come to hospital are included in the study, while the studies done in Ethiopia and Bangladesh were community based studies.

In the current study it was found that low vision was highest among students, followed by those who were employed and lowest among unemployed. This can be due to higher visual demands in employed individuals and young adults who are students as they are required to be able to read books, write and read on the board. Higher visual needs force them to seek for low vision services. In contrast to the results obtained in current study, a study carried out in Bangladesh[32]and Ethiopia[15] showed that prevalence of low vision was higher among illiterate individuals, this difference could be explained by the fact that these were community based studies and reflecting that illiterate people were at disadvantage in terms of accessing health services.

The ability of a person with low vision to achieve improvement in vision depends largely on the residual vision, posture, balance, auditory and tactile abilities, intelligence and personality. In the current study, majority of patients were students and in the category of moderate low vision, followed by severe low vision and only 1% of patients had profound low vision. This could be due to the fact that young adults seek medical health earlier as poor vision interferes with their studies and work, as compared to old unemployed patients. Most of them benefited from low vision devices (both telescopes for distance and magnifiers for near visual acuity), as they possessed most of the good qualities required to achieve success in low vision rehabilitation. They also had the ability to follow instructions better than elderly patients.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion:

The proportion of low vision patients is high among adults attending the eye clinic at Muhimbili National Hospital, with younger patients being affected more than older ones. The major causes of low vision was optic neuropathy, followed by age related macular degeneration, glaucoma, amblyopia, retinitis pigmentosa, albinism, corneal diseases, refractive errors, diabetic retinopathy and lastly macular scars. Most causes are either treatable or preventable.

5.2. Recommendations:

1. Efforts towards increasing awareness among eye care professionals in order to facilitate referral, and management of low vision. Efforts to expand low vision services including making simple, high quality, low cost, low vision devices required. Therefore it is recommended to develop such devices locally, on sound scientific basis.

2. Further research is recommended to identify cause(s) of optic neuropathy in young adults, and to evaluate how these patients are coping with low vision devices prescribed to them.

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7. APPENDICES

7.1: Appendix I: QUESTIONNAIRE

MUHIMBILI NATIONAL HOSPITAL
Date:

LOW VISION ASSESSMENT FORM

NAME:	FN:	DOB:
OPHTHALMOLOGY FINDINGS		
Ophthalmologists		
RE:		
LE:		
Cause of blindness/Low vision:		
Visual Acuity Distance	Right Eye (unaided)	Left Eye (unaided)
	Bin:	
Test Used:		@ m
With Current Glasses	RE:	LE:
REFRACTION ASSESSMENT		
Optometrist:		

RX	RE:	LE:
Distance VA	With Rx	With Rx
Near VA	Unaided @ 40 cm @ cm	
	With Rx LogMAR: @ cm Text: @ cm	
Classification	Blind Low Vision Normal	
Occupation/Needs		
MAGNIFICATION ASSESSMENT		
LVA Assessor		
Eye Selected	Right	Left
Type of magnifier: Hand held Stand Spectacle		
Power of magnifier:		

Near NVA	Reading text : N	Working distance
Reading Stand required Yes No		
Type of Telescope		VA:
Non-Optical Advice		
ACTION/COMMENTS		

7.2. Appendix II: Consent form-English version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS,

ID- NO										

Consent to participate in a study to determine the magnitude and causes of low vision among adults attending the eye clinic at Muhimbili National Hospital.

Greetings madam/ Sir,

My Name is Dr SONIA JAYANT VAITHA of MUHAS.

I am involved in a study on low vision among adults attending the eye clinic at Muhimbili National Hospital. I am recruiting all the patients from the low vision clinic.

Those willing to participate must sign a form to indicate their willingness. Furthermore they will have an interview, physical examination including ocular examination.

You will benefit from the study by knowing your low vision status and what can be done to correct it. The information we collect from you will be confidential and will only be used for the purpose of the study. Your name will not appear in any part of the report.

There are no risks by participating in this study. Your participation is voluntary and you have the right to discontinue from participating in our study at anytime. However your decision may be, will not affect in any way your rights to care and treatment.

I would appreciate if you will agree and take part in this study.

Dr. Sonia JayantVaithasignature …….. investigator

Who to contact

If you ever have questions about this study, you should contact the study principal investigator Dr.SoniaJayantVaitha mob.0657911546 Muhimbili University College of Health Sciences, P.O.Box 65001, Dare es Salaam.

I _____Have understood the above information and my questions have been answered to my satisfaction. Willingly and without any coercion I agree to take part in this study.

Name of: Participant's parent/guardian …….. Telephone…….

Signature of Participant: ……..

Date: ……

Witnessed by …… (principal investigator)

Date ……