MAGNITUDE AND CAUSES OF VISUAL IMPAIRMENT AND BLINDNESS AMONG CHILDREN ATTENDING PAEDIATRIC EYE CLINIC AT MUHIMBILI NATIONAL HOSPITAL, 2010.

By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for

The Degree of Master of Medicine (Ophthalmology) of

Muhimbili University of Health and Allied sciences

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 entitled: **"Magnitude and causes of visual impairment and blindness in children attending pediatric eye clinic at MNH"**, 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 & COPYRIGHT

I, Dr Cellina Mhina, 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……..

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Date……

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DEDICATION

To my mother the late Blandina Mhina who passed away in the mid of this work for sending me to school and never stopped sacrificing in my education. May the Almighty God rest her soul in eternal life.

ABSTRACT

Background: The number of blind years resulting from blindness in children is alarmingly high. Blindness in children can have a significant impact on their performance at school as well as their social interaction and future employment as visually impaired children have a long lifetime of blindness ahead of them. The consequences of visual impairment and blindness in children are an important public health issues with greater impact in developing countries, where 80% of the blindness in children occurs. The control of blindness in children is considered a high priority area within the World Health Organization's VISION 2020 initiative. However many developing countries do not have the accurate information about the magnitude and causes of visual impairment and blindness in children, from which the scope and priorities for prevention and treatment can be identified. To date the established pediatric eye clinic which works as a tertiary eye centre does not have baseline data on the magnitude and causes of visual impairment and blindness in children.

Objective: To determine the magnitude and causes of visual impairment and blindness in children attending pediatric eye clinic at Muhimbili National Hospital, Dar es salaam Tanzania 2010.

Methodology: A cross-sectional study was conducted between June and December 2010. A total of 232 children aged 15 years and below attending pediatric eye clinic at the Muhimbili National Hospital were enrolled. Interview and physical examination was done. The visual acuity of 201 children was assessed by quantitative methods while that of 31 children was assessed by light fixing and following Method.

Results: Among the 201 children assessed by quantitative methods 8% had visual impairment and 4.0% were blind. Of the 62 eyes evaluated by light fixating and following method, 8 (12.9%)

eyes were not able to fixate and follow light. There were multiple causes of visual impairment and blindness among the affected children. Ocular trauma was the predominant cause of both uniocular visual impairment and blindness causing 15, 29.4% and 17, 34.7% respectively. Amblyopia due to congenital cataract was the leading cause of bilateral visual impairment accounting for 31.3% while cortical blindness was the main cause of bilateral blindness responsible for 50.0% of bilaterally blind children. Abnormalities of the optic nerve emerged as an important cause of visual impairment and blindness which affected 7(43.8%) visually impaired children and 2 (25.0%) blind children.

Conclusion: Visual impairment and blindness in children is high among the children attending the pediatric eye clinic at Muhimbili National Hospital with younger children being more affected with blindness than the older ones. Corneal scaring due to measles and vitamin A deficiency were not seen as the causes of visual impairment and blindness in these children. Efforts towards prevention of ocular trauma among children and improvement of antenatal and natal care so as to reduce birth asphyxia and consequently cortical blindness should be emphasized.

TABLE OF CONTENTS

Content **Page**

CERTIFICATION i
DECLARATION & COPYRIGHT ii
DEDICATION iv
ABSTRACT v
ABBREVIATIONS viii
1. 0 INTRODUCTION 1
1.1 Prevalence and causes 1
Control of blindness in children 5
Assessment of vision in children 6
2.0 LITERATURE REVIEW 7
2.1 Prevalence 7
Causes 9
3.0 PROBLEM STATEMENT 13
4.0 RATIONALE 15
5.0 OBJECTIVES 16
5.1 Broad objective 16
5.2 Specific objectives 16
6.0 METHODOLOGY 17
6.1 Study design 17
6.2 Study area 17
6.3 Study population 18
6.4 Inclusion criteria 18
6.5 Exclusion criteria 18
6.6 Sampling and sample size 18
6.7 Procedures 19
6.8 Ethical consideration 20
6.9 Data management and analysis 20
6.10 Definition of terms 20
7. 0 RESULTS 21
8.0 DISCUSSION 31
9. 0 CONCLUSION 35
10.0 RECOMMENDATIONS 35
11.0 STUDY LIMITATIONS 36
12. REFERENCES 37
Appendix I: QUESTIONNAIRE- English version i
Appendix I: DODOSO- (QUESTIONNAIRE SWAHILI VERSION) vi

ABBREVIATIONS

Cong……...Congenital

LE…….Left eye

MNH….....Muhimbili National Hospital

MUHAS……...Muhimbili University of Health and Allied Sciences

MOHSW……..Ministry of Health and Social welfare

ROP……..Retinopathy of Prematurity

RE…….Right eye

VAD…….Vitamin A deficiency

VADD……..Vitamin A deficiency disorders

WHO……World Health Organization

1. 0 INTRODUCTION

1.1 Prevalence and causes

Childhood blindness is a general term used to embrace all occurrences of blindness in children from 0 to 16 years of age. The majority of blindness in children happens before the age of five - a period when 75 per cent of learning is through sight.[1]

Analysis indicates that visual impairment and blindness in children can have a significant impact on their performance at school as well as their social interaction and development. Loss of vision in children influences their educational opportunities, future employment, and social life as visually impaired children have a long lifetime of blindness ahead of them.[2]

Studies show that visual impairment and blindness in children has an effect on the socioeconomic development of individuals and societies. Their consequences are an important public health issue with greater impact in developing countries, where 80% of the blindness in children occurs.[3]

It is estimated that about 45 million people are blind worldwide.[4] The percentage of blind children is only 3%. This shows that despite the actual number of blind children being much smaller than that of adults worldwide, the number of blind years resulting from blindness in children is alarmingly high. An estimated 70 million blind-person years are caused by blindness in children.[5]

The prevalence of childhood blindness worldwide varies from place to place. Levels of socioeconomic development and the under 5 mortality rate of a country contributes highly to the observed variations.[6] The prevalence ranges from an estimate of 0.3/1000 children in countries with high income to 1.5/1000 children in low income countrieswith a global figure estimated at 0.7/1000.[5,6, 20]

Analysis of global epidemiological data on the pattern of blindness indicates that up to 75% of the causes are avoidable. Avoidable blindness is defined as blindness which could be either treated or prevented by known, cost effective means.[7] According to the World Health Organization (WHO) causes of blindness and visual impairment in children are classified according to the main anatomical site of the abnormality and the underlying etiology.[8]

It is documented that glaucoma, hereditary retinal dystrophies and lesions of the optic nerve are predominant causes of blindness in children in high-income countries, while in middle income countries the main causes are retinopathy of prematurity, glaucoma, cataract and lesions of optic nerve.[8] Corneal scarring from measles, vitamin A deficiency, use of harmful traditional eye remedies, ophthalmia neonatorum and rubella cataract are the major causes in low-income countries.[8]

In Sub-Saharan Africa, common causes were found to be ophthalmia neonatorum, ocular trauma, uncorrected refractive error, congenital glaucoma, corneal scarring, measles / Vitamin A deficiency, congenital cataract, and genetic eye diseases.[6] Corneal scarring and phthisis bulbi, mainly attributed to vitamin A deficiency (VAD) and measles were the main causes of blindness in poorest countries as it was seen in West Africa and South India.[9] Refractive errors cases

which are highly prevalent in South-East Asia have been isolated as an important cause for blindness at all levels of social economic development.[10]

Studies report Vitamin A to be an important vitamin in vision, cellular differentiation (e.g. growth, immune response) and in maintenance of epithelial integrity. Studies have been reporting vitamin A deficiency to be the most common cause of blindness in children throughout the world especially in developing countries. Loss of vision or loss of the eye in VAD results from corneal ulcerations, descemetocele which may lead to corneal perforation and loss of the anterior chamber in severe cases.[11]

Cataract is now the leading cause of blindness where corneal scaring as a cause of blindness in children is going down. Literatures defines congenital cataract as a lens opacity that develops in a child, either from birth or soon thereafter. Developmental cataract is described as a lens opacity that develops in a child; generally after the age of2years.[12] Lenticular opacity in the visual axis is considered visually significant and may lead to blindness. [12]

Ophthalmia neonatorum is a neonatal conjunctivitis which presents during the first month of life. It can be caused by Bacteria e.g. Neisseria gonorrhoeae and Chlamydia trachomatis. Viral infections like herpes simplex and chemicals like silver nitrate solution can be important causes. Infants may acquire these infective agents as they pass through the birth canal during the birth process, from attending nurses or from contaminated bed sheets.[13]

Neisseria gonorrhoeae can penetrate intact epithelial cells leading to corneal ulceration that rapidly progress to perforation and endophthalmitis. This may cause loss of vision and finally blindness. Chlamydia trachomatis blindness develops much more slowly and is due to eyelid scarring and pannus. [13]

Studies have revealed that, uncorrected refractive errors for example myopia, hypermetropia and astigmatism affect a large proportion of the population worldwide.[10]Refractive errors 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 a major cause of low vision and even blindness.[7]

Retinopathy of prematurity (ROP) is a disease that affects immature vasculature in the eyes of premature babies. It can be mild with no visual defects, or it may become aggressive with new blood vessel formation (neovascularization) and progress to retinal detachment and blindness.[14] The incidence of ROP has increased because smaller and younger babies are surviving. During the 1940s, ROP was the leading cause of blindness in children in the United States.[15] Recent studies report ROP to be the fifth cause of childhood blindness globally.[16] Many causative factors, like low birth weight, low gestational age, and supplemental oxygen therapy in premature newborn babies, are associated with ROP. Genetic component is also suggested to play a role in the pathogenesis.[14]

Congenital glaucoma is reported to be present at birth, but its manifestations may be recognized in infancy or early childhood.[17] It is caused by mal-development of the anterior chamber angle which may be unassociated or associated with any other major ocular anomalies. The defect will lead to increased intraocular pressure which results into corneal opacity and damage to the optic nerve leading to visual impairment and finally blindness. [17]

Control of blindness in children

Childhood blindness control is considered a high priority area within the World Health Organization's VISION 2020 initiative: "The Right to Sight." [4] This is due to several reasons as children who are born blind or who become blind and survive have a lifetime of blindness ahead of them, with all the associated emotional, social and economic costs to the child, the family, and society. Also many of the causes of blindness in children are either preventable or treatable. Lastly, many of the conditions associated with blindness in children are also causes of child mortality.[8]Vision 2020 aims to eliminate avoidable blindness in the world by 2020 and targets the leading causes of avoidable visual impairment.[18]

Through the VISION 2020 initiative several programmes have been developed in resource-poor countries to control blindness in children. Some strategies have been found to have long term impact on reducing avoidable blindness in children. These includes, establishment of primary eye care centers, empowering local communities in early case detection, educating parents on childhood eye diseases and their prevention, training pediatric eye care teams, provision of appropriate technology and essential equipments for pediatric eye care.[18]

It is reported that reducing visual loss in children poses challenges because there is urgency about treating childhood eye diseases as delay may lead to amblyopia. Also the assessment of vision and examination of the children eyes also pose particular difficulties, which require time and experience on the part of the examiner. Furthermore, children's eyes cannot be considered as smaller versions of adult eyes, because they respond differently to medical and surgical treatment.[8]

Prevention of avoidable visual impairment leads to substantial long-term savings in public health-care and social expenditures, in proportion to the number of individuals who no longer need medical or social assistance. Savings also occur from the significantly reduced commitment made by family members caring for a visually impaired person.[7, 19]

Assessment of vision in children

A child with normal visual development has a tendency to look at the mother`s face and tend to be interested on objects in his/her surroundings. Choice of vision test depends on child`s age, ability, milestones and child behavior.[20]

Preverbal children cannot tell what they can see and preferential looking is the best method used for assessing their vision. Other methods used in preverbal children include Grating acuity (Lea gratings), visual behavior, ability to fix and follow light, hundreds and thousands. An infant of 9 months can easily pick up a tiny sweet at a distance of 30cm and this will indicate normal vision and incase the child does not have good vision will fumble to locate the object.[20] Visual acuity assessment in an infant presents a challenge to the clinicians as young children quickly become disinterested and many methods used to assess their vision like fixing and following light does not have Snellen equivalent.[21]

Children above 2years old can talk and match pictures. Cardiff cards can also be used to assess vision in this age group. Visual acuity tested by these cards can be converted into Snellen equivalent. Children who are 3years old can be assessed by Sheridan gardener letter charts. Snellen chart or E chart is used to assess visual acuity in children aging 4years and above.[20]

2.0 LITERATURE REVIEW

2.1 Prevalence

A recent estimation by the World Health Organization (WHO) suggests that about 161 million people in the world have visual impairment and among them 45 million are blind. Among the blind people 1.4 million are children below 16 years of age.[4, 5]

The prevalence of childhood blindness worldwide is estimated to be around 0.07% and it is estimated to be about one tenth that of adults.[22]However a blind child suffers from more blind-years than adults.

The magnitude varies from country to country and from place to place within one country.[6]Majority of blind children are estimated to live in developing world and Africa in particular as it was estimated that only 6.5% of the blind children live in the developed countries.[23]Approximately three-quarters of the blind children in the world live in the poorest regions of Africa and Asia.[8]

The available data suggest that there may be a ten-fold difference in prevalence between the developed countries of the world and the poorest ranging from 0.3 per 1000 children in wealthiest countries to 1.5 per 1000 children in the poorest countries.[6]

A study done in republic of Czech among children attending school for the visually handicapped found that among 229 children aged 6-15years, 20.5% had severe visual impairment while 69.5% were blind.[24]

A prevalence of visual impairment of 1.1 per 1000 children and that of blindness of 0.33 per 1000 children was observed in China among children from 0 to 6 years of age.[25] In Mongolia it

was found out that the prevalence of blindness and visual impairment to be 0.19 per 1000 children.[26]

In a study to determine the prevalence and etiology of childhoodblindness in a rural population in southern India which included 13,241 children below 16 years of age, 14 children were bilaterally blind giving a prevalence of 1.06/1000. Twenty five of them had monocular visual impairment giving a prevalence of 2.88/ 1000.[27]Anotherstudy in India found the prevalence of childhood blindness to be 0.17%.[28] A hospital based study in India revealed a prevalence of 20%.[29]

A study among children in primary and secondary schools in Nigeria, found that 0.15% children were blind and 1.26% were visually impaired.[30] In Enugu State Nigeria, the prevalence of visual impairment among primary school children was found to be 0.7% and that of blindness was 0.05%.[31] A hospital-based study in Yaoundé, Cameroon among the 1,266 children aged 6 to 15 years, 60(4.7%)presented with unilateral childhood blindness.[32]

In a study to assess the prevalence of refractive error and visual impairment in school-aged African children in South Africa, it was documented that among 5599 children, 191 eyes had visual impairment.[33]

A study done among 312 children attending schools for the blind in Ethiopia, reported that 295 (94.5%) had blindness or severe visual impairment.[34] A similar study done in West Africa, Chile

and South India among 905 children examined, 806 (89%) had blindness or severe visual impairment.[35]

A survey of childhood blindness and visual impairment in Botswana reported that out of 241 children recruited, 79(32.8%) had unilateral visual impairment or blindness and 162(67.2%) had bilateral visual impairment or blindness.[36] In Chikwawa district in Malawi the prevalence of childhood blindness was found to be 0.09 %.[37]In a study done in children in schools for the blind in Kenya, Malawi, Tanzania, and Uganda, out of 1062 children examined, 361 (34%) had visual acuity of less than or equal to 6/60.[38]

In a survey done in Kilimanjaro region in Tanzania, among the 95,040 children in 72 villages, 16 children were blind making the prevalence of blindness to be 0.17 per 1,000 children[39]In Kibaha Tanzania a screening for low vision among the school children found that the prevalence of low vision was 9.5%.[40]

Causes

The major causes of visual impairment and blindness in children vary widely from region to region, being largely determined by socioeconomic development, and the availability of primary health care and eye care services.[8] It is documented that retinopathy of prematurity, glaucoma, hereditary retinal dystrophies and lesions of the optic nerve are predominant causes of blindness in children in high-income countries, while corneal scarring from measles, vitamin A deficiency, use of harmful traditional eye remedies, ophthalmia neonatorum, and rubella cataract are the major causes in low-income countries.[8]

Recent studies have documented that there are at least 190,000 children blind due to cataract world wide.[41] Cataracts are likely to be the leading cause of blindness in children in eastern

Africa and elsewhere in the developing world.[42] This is because managing pediatric cataract is often difficult, tedious and requires appropriate surgical techniques. Also high cost of operating equipments and uneven distribution of ophthalmologists, pediatricians and anesthesiologists poses a challenge.[42]

A study done in China, documented the major causes of childhood visual impairment and blindness were amblyopia (32.8%), retinal and optic nerve diseases (15.6%), congenital cataract (14.1%) and congenital glaucoma (6.3%).[25]

The causes in Chile were found to be retinal diseases (47.0%), cataract (9.2%), glaucoma (8.3%), and (6.9%) due to corneal pathology.[35]In South India corneal scar and phthisis bulbi (38.4%), retinal diseases (22.6%), cataract (7.4%) and glaucoma (3.0%) were the main causes.[35]

Data obtained from studies on childhood blindness done in Saudi Arabia indicate a shift in the causes of blindness from acquired disorders to genetically determined causes.[43] The report showed ocular trauma as the most important cause of unilateral blindness. This was followed by congenital anomalies, unilateral cataract, amblyopia, corneal opacities and iatrogenic factors.[43]

Lesions of the lens (34%), central nervous system disorders (19%), lesions of the whole globe 14%, and retinal conditions (12.5%) were found to be major causes of severe visual impairment and blindness in Mongolia.[26]A different picture was seen in West Africa where corneal scar and phthisis bulbi (35.9%) predominated, followed by retinal diseases (20.4%), cataract (15.5%) and glaucoma (13.0%).[35]

A study done in South-western Nigeria documented the causes of visual impairment to be refractive error (0.87%), cataract (0.16%), corneal opacities (0.2%) and amblyopia (0.08%). That

of blindness was due to corneal scars which were suspected to be due to VAD(0.08%) and keratoconus (0.08%).[30] In Enugu state Nigeria, the observed causes of visual impairment and blindness in children were refractive errors and cataract.[31]

In a hospital-based study in Yaoundé, Cameroon Ocular trauma was found to be the commonest cause of unilateral blindness contributing 65% of all children with unilateral blindness.[32]A study in South Africa showed refractive error be the cause of visual impairment in 63.6% of children. Amblyopia contributed 7.3%, retinal disorders 9.9% and corneal opacity 3.7%. Other causes were responsible for 3.1% and in 12.0% the cause was unexplained.[33]

A different study in Ethiopia, reported the causes of visual loss to be phthisis bulbi (62.4%), optic nerve lesions (9.8%), cataract (9.2%)and uveal lesions (8.8%).[34] Another study in Nairobi hospital revealed the incidence of gonococcal conjunctivitis to be 40 per 1000 (per live newborn) and that of chlamydial conjunctivitis 80 per 1000 (per live newborn). More than 50% of newborns had concurrent gonococcal conjunctivitis. [13]

A survey in Botswana found that trauma was the cause in 83% of unilateral visual impairment or blindness, followed by refractive errors (40%) and amblyopia (31%). Among the bilateral cases, common causes were refractive error (33%) and congenital cataract (31%).[36]

In Chikwawa district in Malawi, lens related opacities (cataract) were found to be the commonest cause (35%) of blindness in children followed by corneal scaring (22%).[37] In a study done in children in schools for the blind in Kenya, Malawi, Tanzania, and Uganda,196 (18%) had cataract as the major cause of visual impairment. Amblyopia was the most common cause of poor visual acuity in children who had undergone cataract surgery.[44]

There are no many surveys to document blindness in children in Tanzania, however a study that associated corneal ulceration and measles found out that among 130 children with corneal ulceration, 37% of ulcers had recent measles infection. Bilateral ulceration was seen in 38% of children of which VAD was the major cause. Other causes were Herpes simplex virus and traditional eye medicines. [45]

It is estimated that in Tanzania, there are between 1000 and1500 children born each year with congenital cataract, and an estimated equal number of children (< 15 years) who develop cataract later on in life.[41]

3.0 PROBLEM STATEMENT

The number of blind children is estimated to be 1.4 million worldwide with global prevalence of childhood blindness of 0.07%. Approximately three quarters of the world's blind children live in the poorest regions of Africa and Asia.[8]

Most of the available data on the prevalence and causes of visual impairment and blindness in children from developing countries have been obtained from examining children from schools for the blind. These data are biased as not all blind children go to these schools.[8]

It is thought that only 10% of blind children in developing countries are in schools for the blind. Blind children not attending these schools are underestimated and not being represented by these data.[8]

The pattern of causes of visual impairment and blindness in children changes with time. The interventions for child health and survival with vitamin A supplementation and measles immunization may have an impact on the causes of blindness.[46] Recent studies in Tanzania were done in schools for the blind. Data from these studies represent the causes 15 years ago and probably may not reflect the current situation.

The control of visual impairment and blindness in childhood is an international priority.[4] However many countries do not have the accurate information about the magnitude and causes of childhood blindness and visual impairment, from which the scope and priorities for prevention and treatment can be identified.[8] Therefore there is a continuing need for further studies to provide up-to date information on the trend of the problem.[46]

No baseline data is available on thecurrent magnitude and pattern of causes of visual impairment and blindnessin children for the established pediatric eye clinic at Muhimbili National Hospital. The results of this study are expected to provide information on the current causes of visual impairment and blindness among children attending the clinic at the tertiary eye centre in Dar es Salaam.

4.0 RATIONALE

The study has provided baseline information on the prevalence and causes of childhood visual impairment and blindness for the clinic and the hospital. The recognition of these causes will be important for the management of patients attending the pediatric ophthalmology clinic and improving their quality of life.

The results will also help in planning and evaluating appropriate preventive and curative services of avoidable causes of blindness in children in the country.Many cases of visual impairment and blindness in children are reported to be avoidable, therefore having measures for their prevention and treatment will have a significant impact on reducing the problem. These data will also help on planning special education and low vision services.

5.0 OBJECTIVES

5.1 Broad objective

To determine the magnitude and causes of visual impairment and blindness in children attending pediatric eye clinic at MNH

5.2 Specific objectives

1. To determine the magnitude of visual impairment and blindness among children attending pediatric eye clinic at MNH
2. To describe the age and sex distribution of visual impairment and blindness in children attending pediatric eye clinic at MNH
3. To determine the causes of unilateral and bilateral visual impairment and blindness in children attending pediatric eye clinic at MNH

6.0 METHODOLOGY

6.1 Study design

A hospital based cross-sectional descriptive study.

6.2 Study area

The study was conducted at Pediatric eye clinic in Muhimbili National Hospital, (MNH) Dar es Salaam Tanzania.

Muhimbili Pediatric eye clinic is part of the ophthalmology department of MNH which has been established in collaboration with the MOHSW, MNH, MUHAS and Sight Savers. The clinic provides tertiary childhood eye services to a catchment population of more than10 million in the regions of Dar es Salaam, Coast, Morogoro, Zanzibar and all children referred from other regions of Tanzania.

The clinic is conducted on Mondays and Fridays from 8.00 am to 3.00pm. About 20 children per day and an estimate of 40 children per week and 160 children per month are attended at the clinic. Muhimbili National Hospital is situated in the middle of Dar es Salaam city in Tanzania. It is a tertiary hospital serving in-patients as well as out-patients from all over the country and a teaching hospital for the Muhimbili University of Health and Allied Sciences. MNH is a government hospital conducting a specialized pediatric eye care in Tanzania.

6.3 Study population

All children aged 0-16 years attending pediatric eye clinic, Muhimbili National Hospital during the study period, June – December 2010.

6.4 Inclusion criteria

1. All patients with eye problems attending pediatric eye clinic at Muhimbili National Hospital during the study period.

2. Willingness to participate in the study and signing a written informed consent by the parents/ guardian.

6.5 Exclusion criteria

1. Children that i have failed to take the visual acuity were excluded from the study.

6.6 Sampling and sample size

Convenient sampling was used. All children 0-16 years old attending pediatric eye clinic, Muhimbili National Hospital during the study period were included.

6.7 Procedures

All parents/guardians with children aged 0-16 years attending pediatric eye clinic during the study were informed about the study. An informed consent was filled by each parents/guardian before the patient was included in the study. A thorough history was taken from parents/guardian. This was followed by a general and systemic examination which was performed by the investigator. All information was recorded on a structured questionnaire.

Ocular examination was performed starting with visual acuity using different methods (Snellen chart, Cardiff cards and K pictures) according to the age and intellect of the child. Fixation and the ability to follow light in children less than one year were tested by using a pen torch. Cardiff cards, K pictures or Sheridan Gardner Singles/ linear were used to assess visual acuity in children aged 2 and 3 years old respectively. For those who are literate and 4 years old Snellen chart was used. The corrected visual acuity of 6/4 - 6/18 was graded as normal, that of <6/18 to ≥3/60 was graded as visual impairment and visual acuity of less than 3/60 was regarded as blind. Squint assessment was done to determine the type and angle of deviation.

Topcon slit lamp bio-microscope was used for examination of the anterior segment of the eye including the eyelids, conjunctiva, cornea, anterior chamber, iris, pupil, lens and anterior vitreous. Intraocular pressure measurement was done using Kowa perking tonometer in suspected cases of glaucoma. A Heine indirect ophthalmoscope was used to examine the posterior segment after dilatation of both pupils using cyclopentolate eye drops 1%. Refraction was done.

6.8 Ethical consideration

The study was conducted after getting permission from the ethical committee of MUHAS, and according to the Helsinki declaration of 1964, in which the patient will be protected. A written informed consent was signed by those parents or guardians who accepted their children to participate in the study.

All children were evaluated by the ophthalmologist and if needed by the pediatrician and were treated accordingly.

6.9 Data management and analysis

All questionnaires were checked daily by the investigator for information gaps which were corrected by re-interviewing the parent/guardian.

Data entry in the computer was done by Epi Info programme and data analysis was done using SPPS software.

6.10 Definition of terms

Visual impairment is defined as presenting visual acuity of <6/18 to ≥3/60 in the better eye with best correction by WHO.

Blindnessis defined as presenting visual acuity of less than 3/60 in the better eye with best correction by WHO.

Unilateral blindness was defined as presenting visual acuity of less than 3/60 in one eye with the best correction.

Children are individuals less than 16 years of age.

7. 0 RESULTS

Two hundred thirty two children were recruited and all were included in the analysis. The age range was 0 – 15 years, with mean age of 6.5 years. There were 133 (57.3 %) males. The visual acuity of 201 children was assessed by quantitative methods while that of 31 children was assessed by light fixing and following Method.

Table 1: Distribution of the study population by age and sex (N = 232)

Age group(years)	Male	Female	Total
	N (%)	N (%)	N (%)
0-4	59(60.2)	39(39.8)	98(42.2)
5-9	35(55.6)	28(44.4)	63(27.2)
10+	39(54.9)	32(45.1)	71(30.6)
Total	133(57.3)	99(42.7)	232(100)

There were 133 (57.3 %) males. Ninety eight (42.2%) of the children were in the age group less than 4 years.

Table 2: The visual acuity of 201 children according to WHO classification

Visual acuity group	Male N (%)	Female N (%)	Total N (%)
Normal (6/4 – 6/18)	102(57.6)	75(42.4)	177(88.0)
Visual impairment (<6/18 – 3/60)	10(62.5)	6(37.5)	16(8.0)
Blindness (< 3/60)	4(50.0)	4(50.0)	8(4.0)
Total	116	85	201(100)

Among the 201 children, 177 (88.0%) had normal vision while 8 (4.0%) were blind. (Table 2)

Table 3: The uniocular visual acuity of 402 eyes

Visual acuity group	N	%
Normal (6/4 – 6/18)	302	75.1
Visual impairment (<6/18 – 3/60)	51	12.7
Blindness (< 3/60)	49	12.2
Total	402	100.0

Among the 402 eyes, 302 (75.1%) had normal vision while 49 (12.2%) eyes were blind. There were 33 (16.4%) right eyes which were blind compared to 16 (8.0%) blind left eyes. (Table 3)

Table 4: The uniocular visual acuity using light fixation and following method (N=62)

Visual acuity	N	%
Able to fixate and follow light	54	87.1
Not able to fixate and follow light	8	12.9
Total	62	100.0

Majority of eyes (54, 87.1%) assessed by light were able to fixate and follow light. (Table 4)

Table 5: Distribution of Visual acuity by age (N= 201)

	Visual acuity group							
Age (years)	**6/4 –6/18**		**<6/18 – 3/60**		**<3/60**		**Total**	
	N	%	N	%	N	%	N	%
0-4	62	92.5	1	1.5	4	6.0	67	33.3
5-9	56	88.9	5	7.9	2	3.2	63	31.4
10 +	59	83.1	10	14.1	2	2.8	71	35.3
Total	177	88.0	16	8.0	8	4.0	201	100.0

Four (6.0%) children in the age group 0 – 4 years were blind compared to 2 (2.8%) blind children in the age group of 10 years and above. The proportion of visually impaired increased with increasing age while that of blind children decreased with increasing age. However the difference was not statistically significant (P value 0.08). (Table 5)

Table 6: Distribution of Visual acuity by sex (N=201)

Sex	Visual acuity						Total	
	6/4 –6/18		<6/18 – 3/60		<3/60			
	N	%	N	%	N	%	N	%
Male	102	87.9	10	8.6	4	3.4	116	57.7
Female	75	88.4	6	7.1	4	4.7	85	42.3
Total	177	88.0	16	8.0	8	4.0	201	100.0

The proportion of blind female children (4.7%) was slightly higher than that of blind male children (3.4%). The difference was not statistically significant. (P value 0.8) (Table 6)

Table 7: Causes of unilateral visual impairment and blindness (N=100)

Cause	Visual impairment		Blindness		Total	
	N	%	N	%	N	%
Trauma	15	29.4	17	34.7	32	32.0
Cong cataract + amblyopia	12	23.5	2	4.1	14	14.0
Cortical blindness	2	3.9	8	16.3	10	10.0
Cong glaucoma	2	3.9	10	20.4	12	12.0
Refractive error	7	13.7	0	0.0	7	7.0
Retinoblastoma	0	0.0	3	6.1	3	3.0
Optic neuropathy	10	19.6	4	8.2	14	14.0
Keratoconus	2	3.9	1	2.0	3	3.0
CMV retinitis	1	1.9	0	0.0	1	1.0
Orbital tumor	0	0.0	1	2.0	1	1.0
Phthisis bulbi	0	0.0	2	4.1	2	2.0
Microphthalmos	0	0.0	1	2.0	1	1.0
Total	51	51.0	49	49.0	100	100.0

There were 51 visually impaired eyes and 49 blind eyes. Trauma was the leading cause of both uniocular visual impairment (15, 29.4%) and blindness (17, 34.7%). However the second and third causes of visual impairment and blindness varied. (Table 7)

Table 8: Causes of bilateral visual impairment and blindness (N=24)

Cause	Visual impairment		Blindness		Total	
	N	%	N	%	N	%
Cong cataract + amblyopia	5	31.3	0	0.0	5	20.0
Cortical blindness	1	6.3	4	50.0	5	20.8
Optic neuropathy	4	25.0	2	25.0	6	25.0
Refractive error	3	18.7	0	0.0	3	12.5
Congenital glaucoma	2	12.5	1	12.5	3	12.5
Keratoconus	1	6.3	0	0.0	1	4.0
Phthisis bulbi	0	0.0	1	12.5	1	4.2
Total	16	66.7	8	33.3	24	100.0

There were 16 (66.7%) visually impaired children and 8 (33.3%) blind children. Cortical blindness was the leading cause of bilateral blindness. (Table 8)

Table 9: Causes of not able to fixate and follow light in 8 eyes

Cause	N	%
Cortical blindness	4	50.0
Retinoblastoma	1	12.5
Congenital glaucoma	1	12.5
Trauma	1	12.5
Microphthalmia	1	12.5
Total	8	100.0

Eight eyes were not able to fixate and follow light. Cortical blindness was the cause in 4 (50.0%) eyes. (Table 9)

Table 10: Distribution of anatomical abnormalities (N = 232)

Anatomical abnormality	Male	Female	Total
	N (%)	N(%)	N (%)
Normal globe	71(56.8)	54(43.2)	125(53.9)
cornea	24(66.7)	12(33.3)	36(15.5)
lens	19(54.3)	16(45.7)	35(15.1)
Optic nerve	11(52.4)	10(47.6)	21(9.1)
Retina	5(41.7)	7(58.3)	12(5.2)
Whole globe	3(100)	0(0.0)	3(1.3)
Total	133(57.3)	99(42.7)	232(100)

Majority of the children (125, 53.9 %) had normal eyes anatomically. (Table 10)

Table 11: Distribution of anatomical abnormality by visual acuity(N=201)

Anatomical abnormality	Visual acuity							
	6/4 –6/18		<6/18 – 3/60		<3/60		Total	
	N	%	N	%	N	%	N	%
Normal globe	102	57.6	2	12.5	4	50.0	108	53.7
cornea	32	18.1	1	6.3	1	12.5	34	16.9
lens	21	11.9	5	31.3	0	0.0	26	12.9
Optic nerve	11	6.2	7	43.8	2	25.0	20	10.0
Retina	10	5.6	1	6.3	0	0.0	11	5.5
Whole globe	1	0.6	0	0.0	1	12.5	2	1.0
Total	177	88.0	16	8.0	8	4.0	201	100.0

The main cause of visual impairment and blindness anatomically was the optic nerve which affected 7(43.8%) visually impaired children and 2 (25.0%) blind children respectively. (P-Value 0.01). (Table 11)

Table 12: The age of onset of ocular problems (N=232)

Age of onset (years)	Male N(%)	Female N(%)	Total N (%)
0 - 4	88(59.9)	59(40.1)	147(63.4)
5 - 9	28(52.8)	25(47.2)	53(22.8)
10 +	17(53.1)	15(46.9)	32(13.8)
Total	133(57.3)	99(42.7)	232(100.0)

Majority of the children (147, 63.4%) had their ocular problems onset at less than 4 years of age.(Table 12)

Table 13: Distribution of age of onset of ocular problems by visual acuity (N=201)

Age of onset (years)	Visual acuity: 6/4 –6/18<6/18 – 3/60<3/60						Total	
	No	%	No	%	No	%	No	%
0 - 4	98	55.4	11	68.8	7	87.5	116	57.7
5 - 9	50	28.2	3	18.8	0	0.0	53	26.4
10 +	29	16.4	2	12.5	1	12.5	32	15.9
Total	177	88.0	16	8.0	8	4.0	201	100.0

Seven (87.5%) and 11(68.8%) blind and visually impaired children respectively had the onset of their ocular problems between birth and 4years of age. (Table 13)

8.0 DISCUSSION

Though the magnitude of childhood blindness varies from country to country and from place to place within one country, the prevalence worldwide has been estimated to be around 0.07%.[22]The current study has revealed a high prevalence of 4%. This seems to be even higher than the prevalances reported by other studies done in other developing countries like China,[25]Mongolia,[26]and Southern India.[27] This can be explained by the fact that the current study was a hospital based whereas the other studies were community based.

Previous reports from Tanzania,[45]Nigeria[30] and Ethiopia[33] found out that corneal scars and phthisis bulbi respectively were the commonest causes of childhood blindness. Other studies from Sub-Saharan Africa reported ophthalmia neonatorum, ocular trauma, uncorrected refractive error, congenital glaucoma, corneal scarring, measles / Vitamin A deficiency, congenital cataract and genetic eye diseases to be among the commonest causes of childhood blindness.[6, 8] The current study found out that cortical blindness related to birth asphyxia being the commonest cause of bilateral blindness accounting for 50.0% of all the blind children. Cortical blindness was again the main cause among the eyes which were not able to fixate and follow light. Birth asphyxia being the commonest cause of bilateral blindness may be a sign of improved neonatal care which has led to improved survival of the babies with birth asphyxia. On the other hand it could be a sign of poor obstetric care.

Corneal scarring due to measles and vitamin A deficiency were not the causes of blindness among children attending the clinic during the study period although it has been known to be the commonest cause of blindness in children.[9,30,45] This could be explained by the successful immunization coverage of measles which has been over 80% for the lastone decade.[47] Moreover vitamin A supplementation has been incorporated into the Expanded Programme on Immunization, hence its low occurrence as a cause of childhood blindness for the moment.

A report from India[28] showed that blindness was more common among female children. Despite that the results were not statistically significant; the current study also reports prevalence of blindness to be higher among female children with the male to female ratio of 1: 1.4. The results are contrary to the study done in Kilimanjaro region in Tanzania[39] which found out the prevalence of childhood blindness to be higher among male children. This difference between these two studies done in two different regions of Tanzania may probably be explained by the attitude/culture of people in Kilimanjaro region who value a male than a female child. However the gender preference to children might not be the case in Dar es Salaam where there is multicultural societies.

Available evidence shows that the majority of blindness in children happens before the age of five - a period when 75 per cent of learning is through sight.[1] Further more the evidence shows visual impairment and blindness in children has an effect on the socioeconomic development of individuals and societies and contributes to the estimated 70 million world blind-person years.[5,3] Almost eighty eight percent of blind children and majority of those with visual impairment, the ocular problems which led to blindness or visual impairment started between birth and 4 years of

age, hence the study can be compared with other studies. The results have highlighted an area where maximum efforts of prevention of childhood blindness can be focused.

Results of the current study showed that, blindness decreased significantly with increasing age. The results can be compared with other studies which reported that in developing countries 50% to 60% of blind children die within 2 years of becoming blind.[48]The studies noted that 10% of newly diagnosed blind children were no longer alive a year later.[48, 49]Despite that the results of the decreasing trend of blindness with increasing age were not statistically significant,this finding could probably be explained by the same reasons identified by other studies.

Evidence from other studies in Africa, [32] noted prevalence of 0.1%-1% for unilateral blindness among children.This study revealed a prevalence of 12.2%.The difference obtained could be attributable to the nature of the study where this was a hospital based study while the previous studies were community based. However, the study done in the republic of Czech reported higher prevalence of 69.5%.[24] This difference might be explained by the fact that the study in the republic of Czech was done among children attending schools for visually hand capped.

Community based surveys done in Botswana[36] and Saudi Arabia[45] on childhood blindness noted ocular trauma as a leading cause of unilateral blindness. This hospital based study has identified ocular trauma to be the leading cause, contributing 34.7% of all unilaterally blind children. Hence, the pediatric eye clinic should put more efforts on eye health education based on prevention of ocular trauma. Ocular trauma is one of the causes of the estimated 75 % of avoidable blindness targeted by Vision 2020 efforts to eliminate avoidable blindness in the world by 2020.[18]

Though the results were not statistically significant, the current study showed that visual impairment increased with increasing age. This trend is not different from the previous studies done in Kibaha[40]and Hyderabad India.[50]The causes related to the increasing trend were reported to be associated with refractive errors especially myopia and astigmatism.[30, 36, 40, 50] However, this study noted amblyopia due to congenital cataract 31.3% and optic neuropathy 25 % were the leading causes of bilateral visual impairment among the children attending the clinic during the study period. This difference may be related to the activities of the pediatrics eye clinic which had put specific efforts to screen and provide health education on childhood cataracts. It may be also a reflection of the well established referral system in Tanzania.

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The World Health Organization (WHO) guidelines classified causes of blindness and visual impairment in children according to the main anatomical site of the abnormality and the underlying etiology. Using this method, this study found out that majority of the children studied had normal eyes anatomically. Furthermore, the current study noted that the abnormalities of the optic nerve were the commonest causes of visual impairment and blindness. Studies done elsewhere in India[2] and Malaysia[51] revealed that abnormality of the cornea, the whole globe and the lens to be the commonest causes of visual impairment and blindness. The fact that the cornea abnormalities were not seen as the main cause of visual impairment and blindness in this study could be contributed by the less occurrence of measles and vitamin A deficiency in the community.

9. 0 CONCLUSION

Visual impairment and blindness in children is high among the children attending the pediatric eye clinic in Muhimbili National Hospital with younger children being more affected with blindness than the older ones. Most of the causes of visual impairment and blindness seen were cortical blindness, ocular trauma, amblyopia due to congenital cataract, congenital glaucoma, optic neuropathy and refractive errors. These causes are either preventable or treatable. Increasing community awareness, early identification and referral, and prompt treatment may lead to substantial reduction of the problem.This baseline data will guide towards putting forward strategies on prevention of ocular trauma and on improving antenatal, natal and postnatal care inorder to reduce cases of cortical blindness as a cause of bilateral blindness.

10.0 RECOMMENDATIONS

1. Efforts towards prevention of ocular trauma among children should be emphasized.

2. The antenatal and natal care should be improved in order to reduce birth asphyxia and consequently cortical blindness.

3. Programmes at the community level for early identification of ocular problems in children and referral should be given priority.

11.0 STUDY LIMITATIONS

Being a hospital based study at a referral hospital in Tanzania, highly selected group of patient was studied hence results from this study may not reflect the situation in the community.

The study was limited by small sample size, as the prevalence of blindness in children is usually too low thus necessitating large sample size for meaningful analysis. However the causes of blindness and low vision are unlikely to be affected by this limitation.

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Appendix I: QUESTIONNAIRE- English version

PREVALENCE AND CAUSES OF VISUAL IMPAIRMENT AND BLINDNESS AMONG CHILDREN ATTENDING PAEDIATRIC EYE CLINIC MUHIMBILI NATIONAL HOSPITAL-DSM 2010

PATIENT PARTICULARS

Serial No…….Date…….

File No……..

Patients name…….

Date of birth…… Age……

Residential area……

Telephone No……

Referral from……..

Informant …… (Relationship)……..

Occupation of parents/ guardians ……..

Level of education (for those older than 3yrs)

1. Not yet

2. Nursery school ☐

3. Primary school

4. Secondary school

Sex 1. Male 2.Female ☐

History

1. What are the complaints of the patient? ☐

   1. unable to see properly?

   2. White pupil

      3. Deviating eyes

      4. Red eye

      5. Others (specify)……

2. Which eye is affected 1.Right….. 2. Left 3. BOTH… ☐

3. At what age did the eye got affected … … ☐

4. Do the child have (had) other eye problems 1.YES (specify) …….. 2.NO

5. If yes which eye is affected 1.Right….. 2. Left 3. BOTH…

6. What was the cause of the eye problem? 1. Injury ….2. Infections ☐

   3. Congenital 4.Others (specify)……

7. Do the child have any history of using local herbs to eye(s) 1. YES 2. NO

Physical examination

General

8. Nutrition _____

9. Child milestones……..

10. Systemic examination…….

Ocular examination

11. Visual acuity RE LE

    1. Good (6/18 and above)
    2. Visual impairment (6/18 – 3/60)
    3. Blind (<3/60)

12. Is the VA improving with pin hole test

    1. YES 2. NO RE LE

13. If yes -do refraction

    1. Hypermetropia
    2. Myopia RE LE
    3. Astigmatism

14. What is the prescription for refraction?

RE LE

15. For children under 1 year, Can the child fixate and follow light

    1. YES 2. NO RE LE

Slit lamp examination

	RE	**LE**
Eye lids		
Conjunctiva		
Cornea		
A/C		

Iris

Pupil

Lens

Vitreous

Fundoscopic examination

RE1. Normal

2. Abnormal (specify) …….

3. Not assessable(hazy media)

LE 1. Normal

2. Abnormal (specify) ……..

3. Not assessable(hazy media)

Squint

RE1. Present 2. Not present

If present 1.Esotropia 2.Exotropia

What is the angle of deviation?

LE 1. Present 2. Not present

If present 1.Esotropia 2.Exotropia

What is the angle of deviation?

Nystagmus

RE1. Present 2. Not present

LE 1. Present 2. Not present

Diagnosis

RE……

LE……..

Treatment received……..

Surgery recommended……..

Appendix I: DODOSO- (QUESTIONNAIRE SWAHILI VERSION)

SABABU ZA UONI PUNGUFU NA UPOFU WA UTOTONI KWA WATOTO WANAOHUDHURIA KLINIKI YA WATOTO YA MACHO HOSPITALI YA TAIFA MUHIMBILI

Nambari…… Tarehe……

Namba ya faili……..

Jina la mgonjwa.....

Tarehe ya kuzaliwa…….Umri ……..

Makazi.....

Namba ya simu.....

Rufaa kutoka.....

Mtoa taarifa.....(uhusiano).....

Kazi ya mzazi/mlezi.....

Kiwango cha elimu (kwa wale wakubwa zaidi ya miaka mitatu)

1.Shule ya awali

2.Shule ya msingi

3.Shule ya sekondari

Jinsia 1. Mvulana 2. Msichana

HISTORIA

1. Je mtoto ana uwezo wa kuona vizuri? 1. Ndiyo 2. Hapana

2. Kama ni hapana ni jicho gani lenye tatizo? 1. kulia 2. kushoto 3. yote

3. ni katika umri gani wakati jicho lilipopata tatizo?.....

4. Je mtoto ana tatizo lingine la macho? 1. Ndiyo (eleza).....2. Hapana

5. Kama ni ndiyo ni jicho gani lenye tatizo? 1. kulia 2. kushoto 3. yote

6. Ni nini sababu ya tatizo la jicho/macho? 1. kuumia 2. uambukizo

3.Amezaliwa nalo 4. mengineyo(elezea).....

7. Je ulishawahi kutumia dawe za asili kwenye macho? 1. Ndiyo 2. Hapana

VIPIMO VYA MWILI

8. Nutrition.....

9. Ukuaji wa mtoto.....

10. Vipimo vya mifumo ya mwili.....

Vipimo vya macho

11. Uwezo wa kuona

1. mzuri (VA 6/18 na zaidi)

2. umepungua (6/24-3/60)

3.haoni (< 3/60)

12. Je uwezo wa kuona unaongezeka na kipimo cha pinhole

1. Ndiyo 2. Hapana Jicho la kulia Jicho la kushoto

13. kama ndiyo apimwe miwani

1. hypermetropia

2. myopia Jicho la kulia Jicho la kushoto

3. astigmatism

14. nini namba ya miwani

Jicho la kulia Jicho la kushoto

15. kwa watoto chini ya mwaka mmoja, je mtoto anaweza kuona na kufuata mwanga wa tochi

1. Ndiyo 2. Hapana Jicho la kulia Jicho la kushoto

Uchunguzi wa macho kwa kutumia slit lump

Jicho la kulia Jicho la kushoto

Eyelids

Conjunctiva

Cornea

A/C

Iris

Pupil

Lens

Vitreous

Uchunguzi wa Fundus

Jicho la kulia

1. halinatatizo

2. linatatizo (elezea) …….

Jicho la kushoto

1. halinatatizo

2. linatatizo (elezea)……..

Makengeza

Jicho la kulia 1. Ndiyo 2.Hapana

Kama ndiyo 1. Esotropia 2. Exotropia

Kiwango cha kengeza

Jicho la kushoto 1. Ndiyo 2. Hapana

Kama ndiyo 1. Esotropia 2. Exotropia

Kiwango cha kengeza

Nystagmus

Jicho la kulia 1. Ndiyo 2. Hapana

Jicho la kushoto 1. Ndiyo 2.Hapana

Ugonjwa

Jicho la kulia .....

Jicho la kushoto……

Matibabualiyopata……..

Upasuajiuliopendekezwa……..

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 of the prevalence and causes of visual impairment and blindness in children attending pediatric eye clinic in **at Muhimbili National hospital**

Greetings madam/ Sir,

My Name is Dr Cellina Mhina of MUHAS.

I am involved in a study on the prevalence and causes of visual impairment and blindness among children attending our hospital. I am recruiting patients from pediatric eye 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 benefits from the study by knowing the type and extent of your eye disease.

The information we collect from you will be confidential and will only be used for the purpose of the study. Your name or the name of your child 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 any time.

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. CellinaMhinasignature_____investigator

Who to contact

If you ever have questions about this study, you should contact the study principal investigator Dr. Cellina Mhina mob.0713326498 Muhimbili University College of Health Sciences, P.O.Box 65001, Dare es Salaam. If you ever have questions about your rights as a participant, you may call Prof. E.F.Lyamuya, Chairman of the college Research and Publications Committee, P.O.Box 65001, Dar es salaam. Tel:2150302-6

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's parent/guardian _____

Date:_____

Witnessed by ----------(principal investigator)

Date ----------

Appendix III: Consent: Swahili version

Habarizaleo,

JinalanguniDrCellinaMhina, kutokachuokikuu cha sayansizatibanahospitaliyaTaifa Muhimbili. Ninafanyautafitikwawatotowenyematatizoya macho wanaohudhuriaklinikiya macho yawatotokatikahospitaliyaTaifa Muhimbili.

Watakaokubalikushirikiitawabidiwasainifomukuonyenshakukubalikwao na pia, tutawahojimaswalikadhaa na kuwapima.

Faidautakayopatakatikautafitihuu ni kujuaaina na kiwangochatatizolakola macho

Taarifazoteutakazotupatia ni siri na zitatumika tu kwaajiliyakuboreshahudumayaafya na utabibukwawagongwa.

Ushirikiwako ni kwahiarikabisa na piaunayohakiyakujitoakatikautafitihuuwakatiwowoteuleutakapojisikiakufanyahivyo.

Uamuziwakowakushirikiama la katikautafitihuu, hautaadhirihatakidogohakiyakokamamgojwayakupatahuduma na tiba.

Nitafurahi ukikubali kushiriki katika utafiti huu.

Dr Cellina Mhina sahihi _____**Mtafiti.**

Nani wa kuwasiliana.

Kama una swali lolote juu ya utafiti huu unatakiwa uwasiliane na mtafiti mkuu, Dr.Cellina Mhina Namba-0713-326498.Chuo kikuu cha afya za tiba Muhimbili. SLB 65001, Dares salaam. Ikiwa una swali lolote juu ya haki zako kama mshiriki katika utafiti huu mpigie. Prof. E.F. Lyamuya, mwenyekiti wa kamati ya utafiti na uchapishaji ya Chuo, SLB 65,001, Dar es salaam.Simu:2150302-6.

Mimi _____

Nimeelewa maelezo yaliyoandikwa hapo juu na kuridihika na maelezo niliyopewa kwa maswali yangu yote. Mimi kwa hiari yangu mwenyewe, bila kushurutishwa na mtu, ninakubali kushiriki kwenye utafiti huu.

Sahihi ya mgonjwa:_____

Jina _____.sahihi ya shahidi_____

Tarehe:_____