



St PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

**PATTERNS OF EYE DISEASE IN CHILDREN VISITING
SPHMMC OPHTHALMOLOGY OUTPATIENT DEPARTMENT
IN 2017**

BY- OBSE MEKONNEN (INTERN)

ADVISORS- TSEDEKE WOLDE (MPH)

BEZAWIT TADEGEGN (MD, OPHTHALMOLOGIST)

**A STUDENT RESEARCH PROPOSAL TO BE SUBMITTED TO THE
DEPARTMENT OF PUBLIC HEALTH, SPHMMC, IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF MEDICINE**

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Summary

Background- pediatric eye diseases are one of the important reasons of medical consultation. Pattern of eye disease in children vary based on whether the children live in developing or developed countries. The most common eye disease encountered in children include infections of the eye and anterior adnexa, refractive errors, amblyopia and ocular trauma. Less common causes of ocular morbidity in children include pediatric glaucoma, cataract and uveitis.

Methods- This study will be conducted in SPHMMC Ophthalmology OPD. It will be retrospective cross sectional descriptive study.

Objective- the aim of this study is to determine the patterns of eye disease in children visiting SPHMMC OPD. Data will be collected with structured questionnaire and analysed by SPSS 21

Budget- the total cost of this study is estimated to be 1900 birr.

Acronyms and Abbreviations

HMIS- Health management information system

OPD- Outpatient department

SPHMMC- St Paul's Hospital Millennium Medical College

SPSS- Statistical package for social science

RE- refractive error

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1 Introduction

1.1 Background information

Ophthalmology is one of the important specialities in the field of medicine. Eye diseases in children are an important reason for medical consultation.¹ Pediatric ophthalmology is an upcoming field. It is a subspecialty of ophthalmology concerned with eye diseases, visual development, and vision care in children. Childhood eye problems if left untreated can have serious impact on the development, learning ability, adjustment in school, personality, communication ability and the quality of life. The impact of eye diseases and visual impairments in children also extend beyond the children themselves to the family and society. Some studies have shown that having a disabled child can increase stress and depression among parents and can lead to an increase in divorce.²

Children are susceptible to many ocular diseases, especially those who are malnourished and living in unhygienic conditions. The pattern of ocular diseases varies, depending on whether they are living in developed countries or developing countries. In general infection and malnutrition are the common causes of visual impairment in children in developing countries. Vitamin A deficiency (VAD) with its ocular consequences is the single most common cause of visual impairment and blindness in children in the developing world, whereas optic nerve lesions, retinal disorders and hereditary factors are the main causes in developed countries. Retinopathy of prematurity (ROP) is an important cause of visual impairment in children in middle-income countries.³

Common childhood pediatric eye diseases include infections of the eye and anterior adnexa, refractive errors, ocular trauma and amblyopia.

Less common childhood ocular disease include pediatric glaucoma, cataract and uveitis.

The red eye is by far one of the common reasons children visit an ophthalmologist.⁴ The most common cause of red eye in children is conjunctivitis. Conjunctivitis is simply the inflammation of the conjunctiva. A variety of disease processes can cause conjunctival inflammation, including an extraocular foreign body, chemical toxicity, trauma, uveitis, episcleritis, allergic disease, viral or bacterial infections, and eyelid inflammation (blepharitis). Intraocular processes, including endophthalmitis (infection within the eye) and tumors associated with necrosis (such as retinoblastoma), can also produce conjunctival inflammation and may present as conjunctivitis. But by far the most common reason for red eye is a simple, benign and self-limiting conjunctivitis.

The second commonest ocular disease observed in children are refractive errors. The main refractive elements of the eye are the cornea and the lens. Emmetropia is the normal state of the eye when the retinal image is in focus for distance, when accommodation is at rest. Hypermetropia (farsightedness), or hyperopia as it is also termed, occurs when the cornea and lens power are not sufficient to bring the image clearly in focus on the retina because of the relatively short length of the eye. Myopia (nearsightedness) occurs when the cornea and lens power are too great for the length of the eye and light focuses in front of the retina. Astigmatism is a condition in which the power of the lens or cornea is different at different axes. Thus, light is not focused on a single point and the image is blurred.⁵

Amblyopia is a condition in which there is dysfunction of the processing of visual information resulting in a range of abnormalities of visual function.⁶ Amblyopia is reduced visual acuity in one or both eyes due to reduced visual input or abnormal binocular interaction early in life. Amblyopic eyes also have deficits in contrast sensitivity, accommodation, and spatial orientation.⁷ there are different types of amblyopia. These include anisometric amblyopia, strabismic amblyopia, derivational amblyopia, organic amblyopia and idiopathic amblyopia.

Ocular trauma are common in children since children are mostly vulnerable to any kind of trauma. In one study it accounted for 65% of emergency room admittances.⁸ Corneal abrasions are one of the most common ocular injuries occurring in children.⁹ The other kind of ocular traumas include hyphemia, subconjunctival hemorrhages, traumatic iritis, traumatic cataracts, and traumatic subluxation of the lens.

Trauma to the retina can also occur in small number of children.

Cataracts remain one of the most important causes of treatable blindness in children.¹⁰ The reported incidence of infantile cataracts range from 1 to 13 per 10, 000 live births.¹¹ Infantile cataracts can be classified by the location of the lens opacity, as anterior cataracts and posterior cataract. There are multiple aetiologies for infantile cataract which include hereditary cataracts, part of a systemic disease, intrauterine infections and idiopathic.

Childhood glaucoma is a rare entity but can have serious vision threatening consequences. Manifest glaucoma in children younger than 3 years usually causes visible distension of the eye globe, leading to the historical term “buphthalmia” (ox eye).¹² Pediatric glaucoma can be divided into two main categories; primary and secondary. The primary group is sub classified according to the presence or absence of associated systemic or other significant ocular anomalies. The second group is classified according to the aetiologies.

1.2 Statement of the Problem

Pediatric ophthalmology is one of the neglected fields. There are an estimated 19 million children worldwide with visual impairment.¹³ In 2010, it was estimated that there were about 1.26 million Blind children globally and a vast majority of them lived in most poor countries Of Asia and Africa.¹⁴ Globally, an estimated 70 million blind years are caused by childhood blindness. Approximately 500,000 children become blind every year which is equivalent to one child every minute; 60% die within 1 to2 years of becoming blind.¹⁵ Most of a child's learning comes through the visual system. Hence eye health is essential for the development and complete wellbeing of a child. However children eye health is mostly forgotten in the child health agenda and remains a neglected area despite the fact that it has immense implications on the individual child, family and in broader society.

In one study done, which was a review of different studies that was conducted on childhood eye disease in Ethiopia, Corneal scarring was the leading causes of blindness and it accounted for 59% of the causes. This was followed by cataract, corneal opacity and refractive error and glaucoma. Trachoma which is the leading cause of visual impairment in Ethiopia is one of the preventable and curable disease.¹⁶

80-90% of blindness in Ethiopia is attributed to preventable (curable) disease.

The problems that are faced by visually impaired children is also not purely physical alone. These children are seen as a burden to the family and at large the society. They are also shunned and rejected which leads to the feeling of hopelessness and despair. These children also face difficulties in their education.

1.3 Significance of the Study

SPHMMC is one of the biggest referral hospitals that give eye care for different children coming from all over the country. There are no previously done studies in St Paul regarding the matter at hand. So knowing the pattern of eye disease in children will help in

- Useful baseline for planning child eye care services
- Proper and efficient allocation and investment of resources for preventive and control measure as well as treatment of childhood eye disease since most of them are easily preventable and treatable
- Helps to prioritize the use of resources efficiently in areas where there is scarcity of resource
- To plan on special education services for those with visual impairment

2 Literature Review

In a cross-sectional, descriptive and retrospective analysis of medical records of children enrolled in center of reference in Ophthalmology in Brazil, the disease most commonly found was infectious conjunctivitis (26.4%) and allergic blepharitis (21.4%), chalazion (3.6%), strabismus (12.06%), diseases of the retina and vitreous (2.6%), cataract and lens changes (2.1%).¹⁷

In a population based cross sectional study done in Nepal, the overall prevalence of ocular morbidity was 3.7% and blindness was 0.07%. Children whose mother smoked, drank alcohol, or was illiterate were significantly affected with ocular disease, in addition a higher prevalence of ocular disease related to children with past medical history of systemic illness, abnormal postnatal period or missing childhood vaccination.¹⁸

In a cross sectional survey done in Western China on children the prevalence of eye disease in descending order were, refractive error (20.69%), conjunctivitis (11.76%), amblyopia (1.88%), color vision defect (0.52%), keratitis (0.36%), strabismus (0.29%), cataract (0.23%), pathologic myopia (0.19%) and ocular trauma (0.13%). The prevalence of corneal leucoma, corneal staphyloma, optic neuropathy, macular degeneration, and myelinated nerve fibers was 0.03% for each. The prevalence of visual impairment was 7.70%.¹⁹

In a descriptive retrospective study done on patients visiting the paediatric ophthalmology clinic in Punjab, Diseases of lens affected 33% of the patients examined. Squint was the second most common disorder seen affecting 17% of these children. Errors of refraction affected 15% and oculoplastic 9%. The rest of the conditions were glaucoma 6%, conjunctival diseases 4%, vitreoretinal 3%, orbital 3% and miscellaneous 3%.²⁰

In a prospective study done in pediatric ophthalmology unit in Rajnandgaon, India, refractive error was the most common (29.25%) ocular morbidity followed by allergic conjunctivitis (17.92%) & infection of eye and adnexa (14.72%).²¹

In another cross sectional study that was conducted in Eye Department of R D Gardi Medical College, Ujjain, India, Refractive error was most common ocular problem detected in (41.90%) children, (1.63%) children were found to be suffering from amblyopia. Conjunctivitis was seen in

(14.09%) children. Congenital cataract, spring catarrh, vitamin A deficiency, trachoma, and dacryocystitis were other common diseases found.²²

In a prospective study that was conducted in pediatric ophthalmology unit in Karachi, Pakistan VKC 24.8% was the most common ocular morbidity found followed by squint 15.2%, refractive error 14.8%, NLD blockage 14.0%, congenital cataract 6.0%, amblyopia 4.4%, infective conjunctivitis 4.4%, blephritis 4.0%, convergence insufficiency 4.0% ptosis 2.4%, traumatic cataract 2.0%, chalazion 1.6%, corneal opacity 1.6%, keratitis and sty each 0.4%.²³

In a retrospective study done in pediatric ophthalmology unit in Saudi Arabia, the most common causes of pediatric ocular morbidity are Strabismus(36.9%), refractive error(26.5%), ocular trauma (7.5%), infection of the cornea and conjunctiva(7.3%), and keratoconus (6.2%).²⁴

In a retrospective study done in eye clinic of Wesley guild hospital Ilesha, Nigeria the commonest childhood eye diseases include ocular trauma (21.7%), allergic conjunctivitis (17.8%), infections of the eye and its adnexa (15.4%) and refractive errors (14.3%).²⁵

In a retrospective study done in Jimma University, Department of Ophthalmology in the year of 2010, The commonest childhood ocular diseases diagnosed in 2010 were ocular surface and eyelid infections (30.5%), ocular allergies (28.1%), ocular traumas and injuries (15.5%) and refractive errors (5.8%). Avoidable eye diseases accounted for about 97% of ocular morbidities.²⁶

In a Cross-sectional study conducted at a rural eye hospital in central Ethiopia between August–October 2012, the most common ocular morbidity encountered was conjunctivitis (35%), then ocular trauma (11.8%), refractive error (11.4%) and trachoma (7.6%). Bilateral visual impairment (UCVA < 6/18 in the better eye) was found in 119 children, and the causes were refractive errors (47.1%), keratitis/corneal opacity (16%), amblyopia (14.3%), ocular trauma (11.8%), cataract (6.3%), Glaucoma (2%) and uveitis (2%).²⁷

3 Objective of the study

3.1 General objective

The objective of this study is to determine the patterns of eye disease in children who visited the ophthalmology unit of St Pauls' Hospital Millennium Medical College in the year 2017 GC.

3.2 Specific objective

- 1) To identify the commonest childhood ocular disease among children visiting Ophthalmology OPD
- 2) See the pattern of eye involvement of the ocular disease
- 3) To identify the preventable causes of childhood ocular disease

4 Methods and Materials

4.1 Study Area

Addis Ababa is the capital and largest city of Ethiopia. It is located in West Shewa, Oromia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), AA has a total population of 3,384,569 and lies at an altitude of 7,546 feet (2,300 meters). The estimated population of Addis Ababa in 2017 is around 6.6 million. The City has surface area of about 530.14 km². The population density of Addis Ababa is 5165 persons per square kilometer. The city possesses a complex mix of highland climate zones. There are 10 sub cities within Addis Ababa. The study will be conducted in SPHMMC, ophthalmology unit, which is located in Gulele Sub city.

SPHMMC is the second largest central referral hospital in Ethiopia next to Black lion Hospital. SPHMMC is selected because it is one of the few governmental center that provide eye care and treatment. The Hospital was built by Emperor Haileselasie I in 1969 G.C as a source of medical care for underserved populations. It was named St Paul General specialized Hospital till 2008 and a medical college were formed in 2007. The college has undergraduate programs in medicine of doctor since 2007GC.

4.2 Study Period

The study will be conducted from January 2017 up to December 2017.

4.3 Study Design

A hospital based retrospective cross sectional study design will be selected as an appropriate method to conduct this particular research.

4.4 Population and Sampling

4.4.1 Source Population

All Children visiting the SPHMMC ophthalmology OPD unit

4.4.2 Study Population

All children who visited the SPHMMC ophthalmology OPD in the year 2017

4.4.3 Study Subject

All children who visited the SPHMMC ophthalmology OPD in the year 2017 who fulfilled the inclusion criteria.

4.4.4 Inclusion and Exclusion Criteria

Inclusion criteria

- All children less than 16 years of age

Exclusion Criteria

- Children whose charts are not complete

4.4.5 Sampling Technique

Sampling frame for this study will be HMIS book of patient records. From which pediatric patients with eye diseases will be sampled by systematic random sampling method. The first chart to be reviewed will be selected by lottery method.

4.4.6 Sample size determination

From a previously done study the prevalence of eye disease in children is 20.4%. With the above p value the sample size will be calculated using Hollander's formula with confidence level of 95% and margin of error 5%. Where

N= study population which is, 1251, the number of children who visited the ophthalmology OPD in the year 2017

D= margin of error

P= proportion

α =degree of accuracy

n = sample size

$$n = \frac{\frac{Z^2 p(1-p)}{d^2}}{1 + \frac{1}{N} \left(\frac{Z^2 p(1-p)}{d^2} \right)} = 207$$

4.5 Study variables

4.5.1 Independent Variables

- Sociodemographic variables- age, sex, residence, school level, family status
- Visual acuity

4.5.2 Dependent Variable- the different type of ocular diseases observed in children

4.6 Operational definitions

- Children- those whose age is less than 16 years
- Normal Vision- Presenting visual acuity in one eye which is 6/18 or better
- Low Vision- Presenting visual acuity in the better eye of <6/18 but equal or better than 3/60
- Blindness- Presenting visual acuity in the better eye of less than 3/60
- Visual impairment (low vision+ blindness)- Presenting visual acuity of <6/18 in the better eye

4.7 Data Collection Methods

Data will be collected by using investigator administered structured standard questionnaires from the charts of pediatric patients with eye diseases.

4.8 Data processing and management

Following permission from authorized personals of HMIS chart we be reviewed at the same time response to prepared questioners will be filled by the data collector. Questionnaires will be checked for completeness and accurateness to determine the validity.

4.9 Data Analysis

Data from the questionnaire will be coded, entered and analyzed using Statistical package for Social Sciences (SPSS 21) software. To observe the overall trends in the data Descriptive statistics such as frequency, graphics and cross tabulations will be calculated for dependent and independent variables; and also association between dependent and independent variables will be made by using chi square test. P -values below 0.05 will be considered statistically significant.

5 Ethical Consideration

Approval from SPHMMC public health department, academic & research vice provost should be received for this study prior to enrollment. A formal letter is written by the vice provost to the concerned office. Permission will be asked from the responsible body of the unit. Each data collector will be adequately informed about the purpose, methods, and anticipated benefits of the study. Questionnaires will be filled by volunteer data collectors who are available at the time of data collection. The information collected from the charts will be kept private, that the names will not be shared.

6 Dissemination of finding

The finding will be first submitted to SPHMMC public health department for evaluation purpose and a copy of it will be given to SPHMMC Ophthalmology department.

7 Work Plan

	Task to be performed	Months	Number of days required
1.	Title selection	November 22,2017	15 days
2.	Proposal development	Nov. 23 – Jan 24,2018	69 days
3.	Submission of the proposal	Feb 7, 2018	1 day
4.	Ethical clearance	Feb 19, 2018	1day
5.	Research data collection	Mar 12-May 7,2018	60 days
6.	Data analysis and report writing	May 8-June 19, 2018	41 days
7.	Finalizing research report	July 3- July16,2018	13 days
8.	Presentation of Research report	July 25,2018	1 day
	Submission of research document	July 30,2018	1 day

8 Budget

No	Item	Estimated price
1	Material cost	500.00 ETB
3	Card accessing cost	1000.00 ETB
4	Miscellaneous cost	400.00 ETB
5	Grand total cost	1900.00 ETB

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