St. Paul's Hospital
Millennium Medical College
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ST PAUL'S HOSPITAL MILLENIUM MEDICAL COLLEGE

SCHOOL OF MEDICINE, DEPARTMENT OF OPHTALMOLOGY

PREVALENCE AND ASSOCIATED FACTORS OF AMBLYOPIA AMONG CHILDREN VISITING PEDIATRIC OPHTALMOLOGY CLINIC OF ST PAUL'S HOSPITAL MILLENIUM MEDICAL COLLEGE

BY MUNTEHA JELAU, MD, RESIDENT IN OPHTALMOLOGY

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Prevalence and associated factors of Amblyopia among Children Visiting Ophthalmology Department of St. Paul's Hospital Millennium Medical College

By: Munteha Jelalu, MD, Resident in ophthalmology

Advisors:

Bezawit Tadegagne, MD, Pediatrics ophthalmology and strabismus subspecialist

Mandefro Sintayehu, MD, Pediatrics ophthalmology and strabismus subspecialist

Hiwot Birhanu, BSc, Pedatric Optometrist

Takele Menna, PhD, Associate Professor of Public Health

A Research Thesis Submitted to the Department of Ophthalmology, School of Medicine, SPHMMC in a Partial fulfillment for the requirements of Specialty Certificate in Ophthalmology

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NAME OF INVESTIGATOR	MUNTEHA JELALU (MD), OPHTALMOLOGY RESIDENT
NAME OF ADVISOR	BEZAWIT TADEGEGN, MD, PEDIATRIC OPHTALMOLOGY AND STRABISMUS SUBSPECIALIST MANDEFRO SINTAYEHU,MD, PEDIATRIC OPHTALMOLOGY AND STRABISMUS SUBSPECIALIST HIWOT BIRHANU, BSc, PEDIATRIC OPTOMETRIST TAKELE MENNA, PhD, ASSOCIATE PROFESSOR OF PUBLIC HEALTH
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TOTAL COST	26,382 ETHIOPIAN BIRR
ADDRESS OF INVESTIGATOR	EMAIL: muntesemer100@gmail.com CELL PHONE: +251-938109380

Declaration

I, the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for speciality certificate in Ophtalmology.I also declare that it has never been presented in this or any other university and that all resources and materials used in the thesis have been duly acknowledged.

Student Name: _____

Signature: _____

Place of submission: _____

Date of submission: _____

This thesis has been submitted with my approval as a College/university advisor.

Advisor Name: _____

Signature: _____

Date of submission: _____

Advisor Name: _____

Signature: _____

Date of submission: _____

Advisor Name: _____

Signature: _____

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Acronyms and Abbreviations

AC: Anterior Chamber

AD: Anno Domini (in the year of the Lord)

BC: Before Christ

BCVA: Best corrected visual acuity

CNLDO: Congenital Nasolacrimal duct Obstruction

CSM: Central, Steady, Maintained

D: Diopters

ERMP: Ethiopian residency matching program

G.C: Gregorian calendar

IRB: Institutional Review Board

OPD: Out Patient Department

PI: Principal Investigator

POC: Pediatrics Ophthalmology Clinic

SER: Spherical Equivalent Refraction

SPHMMC: Saint Paul's Hospital Millennium medical college

SPSS: Statistical Package for the Social Sciences

UVA: Uncorrected Visual Acuity

VA: Visual Acuity

VI: Visual Impairment

VH: Vitreous hemorrhage

Abstract

Background: Amblyopia, a leading cause of preventable childhood visual impairment, results from abnormal visual development during the critical period. Late diagnosis, often due to low awareness, can lead to irreversible vision loss. However, data on its prevalence and risk factors in Ethiopia remain limited and inconsistent.

Objectives: The main aim of this study is to assess the prevalence and factors associated with amblyopia among children aged 3 to 15 years who were attending pediatric ophthalmology clinic at SPHMMC, Addis Ababa, Ethiopia, from September 2024 to August 2025.

Methodology: A cross-sectional study was conducted in children aged 3 to 15 years visiting Ophthalmology department of SPHMMC. Seven hundred fifty-one children visiting the ophthalmology department from September 2024 to August 2025 were recruited with systematic random sampling. Data was collected using a structured interviewer-administered questionnaire and clinical examination by trained nurses, residents, and optometrists. Data was cleaned using Epi data software version 7.2.7 and analyzed using SPSS software version 26. The factors associated with amblyopia were explored using bivariate and multivariable logistic regression models. A P value < 0.05 was used to declare the statistical significance of the association between the dependent and independent variables.

Result: Among 751 children, the overall amblyopia prevalence was 30.36% (CI: 27.1%–33.8%) (n=228). Strabismic amblyopia was the most common type (73.68%), followed by isometropic (57.46%) and mixed amblyopia (42.98%). As the multivariable logistic regression analsis showed refractive error (aOR=39.64, 95% CI: 16.00–98.18, p<0.001), strabismus (aOR=24.91, 95% CI: 12.96–47.88, p<0.001), and cataract history (aOR=15.14; 95% CI: 2.34–97.77, p=0.004) were independently associated risk factors for amblyopia.

Conclusion: This study exhibited that prevalence of amblyopia among children in the study area is significant. Additionally, refractive error, strabismus and cataract history were found to be important factors associated with amblyopia among children. Local health authorities should strengthen community-based childhood vision screening and awareness programs to promote early detection and management of amblyopia and its associated risk factors.

Keywords: Amblyopia, Associated factors, St. Paul's Millennium Medical College Hospital

Introduction

1.1. Background

Amblyopia originates from the Greek language which means dimness or dullness of vision. It is also called lazy eye in a layman's term. Depending on the prevailing pathophysiological concept about its etiology this condition has been defined in a variety of ways. Because of modifications to the visual system, eyesight develops continuously during the first decade of life(1). Amblyopia happens when the eye is not given enough stimulation in the first decade of life (1, 2, 3).

Clinically, Amblyopia is defined as a decline in visual acuity (VA) below 6/9 in either eye following the best feasible correction, or a snellen VA discrepancy between the two eyes of more than or equal to two lines (2, 3). Despite varying causes, aberrant binocular contact between the eyes or deprivation in one or both eyes are the fundamental mechanisms in all cases. In humans, the maximum critical age at which children are most susceptible to amblyopic diseases is approximately 8 years of age (4, 5, 6).

Ocular causes of amblyopia include strabismus, anisometropia, high-refractive errors, and opacities of the ocular media, or a combination of two or more etiologies in the same patient. In spite of different causes, the basic mechanisms in all cases are either abnormal binocular interaction between eyes or from deprivation in one or both eyes (4, 5, 6).

Non-ocular risk factors for amblyopia include prematurity, low birth weight, a family history of amblyopia, and neurodevelopmental delay (7, 8). Different studies investigating perinatal, socioeconomic, and demographic risks identified non-ocular factors associated with amblyopia such as maternal smoking during pregnancy, prematurity, Apgar score, and neonatal intensive care unit hospitalization (9, 10, 11, 12).

Associated factors of amblyopia have not been extensively studied in Ethiopia, and there is a significant variation in the prevalence of amblyopia across different regions and institutions. Therefore, investigating the association between amblyopia and the risk factors can provide valuable insights into the causes of this variation in prevalence and help identify potential solutions.

The objectives of amblyopia management are to correct the underlying cause, provide refractive correction for reduced VA and promote usage of the amblyopic eye by occlusion or blurring of the fellow eye. The ideal goal is to achieve equal VA between both the eyes. The prognosis of treatment is better in younger children; however, therapy should be offered to all children, regardless of age. Various factors that influence the final visual outcome are age of onset; cause, duration and depth of amblyopia; previous treatment history, ocular co-morbidities, and compliance to treatment (13).

1.2. Statement of the Problem

Amblyopia is a prevalent issue among children and affects people's childhood and adult lives as well as the community at large in a variety of ways (14). Amblyopia is the most common cause of monocular vision loss in children with an estimated prevalence of 1–5%, depending on population and study (15).

A meta-analysis of 60 studies (1 859 327 subjects) showed that the pooled prevalence rate of amblyopia was 1.44%. Prevalence in Europe is 2.90% and North America is 2.41% which were higher than the prevalence in Asia which is 1.09% and in Africa which is 0.72%. The highest prevalence was found in subjects over 20 years old which is 3.29%. There was no difference in the prevalence between genders. In this study it was estimated 99.2 million people were amblyopic in 2019 worldwide, increasing to 175.2 million by 2030 and 221.9 million by 2040 (16).

Another meta-analysis showed the total prevalence of Amblyopia in the children of the world to be 4.3%. The subgroup analysis showed that America had prevalence of 5.57%, and Africa had 7.1% (17).

The estimation differs across all continents, particularly in Africa. The variety of studies was cited as the main cause of this difference. Thus, more reliable and valid research needs to be done in order to determine the actual prevalence of amblyopia in children worldwide as well.

The prevalence of amblyopia in hospital-based studies in Uttarakhand (north India) was 8.6%, in clinic-based study in Saudi-Arabia was 9.1% (18, 19).

The available data on the prevalence and associated risk factors of amblyopia in Ethiopia is limited and inconsistent. A Community-Based Cross-Sectional Study among school age community of Bahir Dar city, a hospital-based study at Menilik II Hospital in children below the age of 15 years, and a hospital-based study at Hawassa University Comprehensive Specialized Hospital in children 5 to 15 years showed the prevalence of amblyopia to be 6.5%, 9.1% and 23.8% respectively. And in a school-based study in children age between 6 - 15 years in Gondar the prevalence of amblyopia was 4.7% (20, 21, 22, 23).

Amblyopia significantly affects a person's ability to succeed academically, choose a vocation, use their visuomotor skills, interact socially, develop psychologically, and engage in the economy (5, 6). Children whose amblyopia is unilateral are also more susceptible to bilateral visual impairment (9). A growing number of studies reports reduced reading proficiency in children with amblyopia compared to those with normal vision development (24). Larger fine motor skill deficits have been associated with worse amblyopic eye visual acuity and stereopsis (25, 26, 27, 28, 29, 30).

Although the prognosis for starting treatment later than usual is not promising amblyopia can be cured with a potential early intervention (13).

Amblyopia identification is an important step in ensuring the normal development of children. Recognizing and avoiding the amblyopic risk factors will decrease the vision loss in childhood and will increase the quality of life of the adult. In order to identify amblyopia, a complete ophthalmological examination is mandatory (31).

1.3. Rationale of the Study

The prevalence of amblyopia shows considerable variation across different regions and institutions in Ethiopia. However, there is a lack of extensive research on the associated factors, particularly the non-ocular risk factors, within the country. Consequently, conducting a study to examine the relationship between amblyopia and these risk factors would offer valuable insights into the underlying causes of the prevalence variation. Such research can also aid in identifying potential solutions to address the issue effectively.

The prevalence and risk factors linked with amblyopia at the pediatric ophthalmology clinic of SPHMMC is displayed in this study.

The study's outcome will serve as a starting point for more research on the path to lowering the Prevalence of amblyopia and addressing its avoidable risk factors. This study has also identified at risk population with in SPHMMC can guide targeted screening and intervention programs, ensuring equitable access to care for those who need it most.

By determining the prevalence of amblyopia, we can evaluate the effectiveness of existing screening methods.

The prevalence data obtained can help policy makers, health care professionals and administrative bodies both at the hospital level and as a country at large to allocate resources more effectively and prioritizing funding for appropriate interventions.

2. Literature Review

A comprehensive review conducted at Tabriz University of Medical Sciences in Iran, in 2020G.C, examined the prevalence of amblyopia in children worldwide. The meta-analysis revealed that approximately 4.3% of children globally are estimated to have amblyopia. The highest prevalence was found in America with 5.58%, followed by Europe which is 4.58%, Asia which is 3.83%, and Africa which is 0.71% (17).

In a population-based study in Baltimore, MD, USA, in 2009 G.C. involving White and African American children aged 6 to 71 months. Amblyopia was found in 1.8% of White children and 0.8% of African American children. The study also revealed that 3.3% of White children and 2.1% of African American children had manifest strabismus. Additionally, the risk ratio for amblyopia between the two groups was 2.23 (32).

A population-based, cross-sectional study was conducted in 2015 G.C. using data from the Refractive Error Study in Children (RESC), involving children aged 5 to 15 years. The overall prevalence of amblyopia was found to be 0.74%. There was a significant variation in the prevalence of amblyopia across different ethnic groups: 1.43% in Hispanic children, 0.93% in Chinese children, 0.62% in Indian children, 0.52% in Malay children, 0.35% in Nepali children, and 0.28% in African children. The study did not find any association between amblyopia and age or gender. The most common cause of amblyopia was anisometropia (33).

A study conducted in 2018, in an Eastern European country on children aged 5 to 16 years with refractive error found that 2.8% of participants had amblyopia. The study revealed that several eye conditions, such as hyperopia, astigmatism, anisometropia, esotropia, exotropia, and CNLDO, along with a family history of amblyopia, were associated with the condition. Additionally, non-ocular risk factors for amblyopia included low birth weight, prematurity, a low Apgar score, maternal age, maternal smoking history or exposure to a toxic environment, and maternal body mass index before conception (34).

A retrospective study was carried out at Sakarya University Hospital in Turkey,in 2022 G.C., involving 803 patients with a median age of 8 years. The study aimed to assess non-ocular risk factors in Turkish children with strabismus and amblyopia. Out of the total patients, 786 were assessed, revealing that 55% had esotropia (ET), 32.6% had exotropia (XT), and 12.5% had amblyopia as their primary diagnosis. There was a higher occurrence of positive family history for strabismus or amblyopia among all the risk factors examined (35).

In a cross-sectional study conducted in Mashhad Country in 2017 G.C. showed prevalence of amblyopia to be 4.6%, with 54% of cases being unilateral. The lowest prevalence was observed in the 5-15 years age group (2.24%), while the highest was found in the 55-65 years age group (7.14%). The study also revealed that amblyopia was more prevalent among low-income participants. Females had 1.48 times higher odds of developing amblyopia compared to males, and the likelihood of amblyopia increased by 2% for each year of age. The odds of amblyopia were 2.77 for individuals aged 55-64 years, and participants with a university education had 0.7 times the odds of amblyopia compared to illiterate participants (36).

A descriptive cross-sectional study was conducted at Eye Foundation Hospital (EFH) and Deseret Eye Centre (DEC) in Lagos, Nigeria, between November 15, 2014 and May 15, 2015. The study found a prevalence of amblyopia of 12.9%. The most common type of amblyopia was ametropic amblyopia (4.1%), followed by anisometropic (2.3%) and sensory deprivation amblyopia (2.3%). Among children under 5 years old, strabismic amblyopia was predominant (8.8%) (37).

In a cross-sectional study conducted at an unspecified tertiary care center in 2014 G.C. 2,700 children were included among which, 58 children (4.8%) were diagnosed with amblyopia. Amblyopia was more common in males (63.79%) than in females. It was also observed to be lower in urban children (32.76%) compared to rural children (67.21%). Monocular amblyopia cases (68.96%) were more prevalent than binocular cases (31.04%). The most common causes of amblyopia in this study were anisometropic (36.20%), strabismic (25.86%), ametropic (12.06%), merdionic, and visual deprivation (6.89%) amblyopia, respectively. Among refractive amblyopia cases, hypermetropia (46.15%) was the most common refractive error, followed by myopia (25.64%) and astigmatism (18.20%). Exotropia (53.33%) was more frequently associated with strabismic amblyopia than esotropia (40%) and hypertropia (6.66%) (38).

A descriptive, cross-sectional study was conducted among primary school pupils in Kosofe town, Lagos State, Nigeria, in 2018. Amblyopia was found in 24 (1.41%) children. It was determined that children whose mothers had no formal education at the time of childbirth were 11 times more likely to have amblyopia. Furthermore, children with a birth weight below 2500 g had a 10-fold increased risk of developing amblyopia. Additionally, children with a positive family history of crossed eyes were eight times more likely to have amblyopia (39).

A cross-sectional study was conducted among school-age children in Bahir Dar city from April 1 to May 29, 2018 G.C. The prevalence of amblyopia in this population was found to be 6.5%. Anisometropic amblyopia and ametropic amblyopia were the most common types observed. Among the 39 children with amblyopia, 15 had multiple causes. Ten of them had both refractive and anisometropic amblyopia, three had refractive and strabismic amblyopia, one had deprivational, refractive, and strabismic amblyopia, and one had strabismic and anisometropic amblyopia. In the multivariable binary logistic regression analysis, children with a history of visual deprivation were 8.3 times more likely to have amblyopia compared to those without such a history. Participants with anisometropia greater than 2D had approximately 9.3 times higher odds of having amblyopia compared to those without anisometropia. Similarly, participants with a refractive error exceeding +5D hypermetropia had approximately 22 times higher odds of having amblyopia compared to those with no or mild refractive error (20).

In a descriptive community-based cross-sectional study conducted in Gondar, Ethiopia, during January and February 2015, a total of 1,287 school children aged 6 to 15 years participated. The prevalence of amblyopia was found to be 4.7%. Among the children with amblyopia, females accounted for 56.7% (34/60). Bilateral amblyopia was more frequent, accounting for 55% (33 cases), compared to unilateral amblyopia, which accounted for 45% (27 cases). The most common types of amblyopia were anisometropic amblyopia (38.3%, 23 cases), ametropic amblyopia (38.3%, 23 cases), strabismic amblyopia (6.7%, 4 cases), deprivational amblyopia (8.3%, 5 cases), and posterior segment abnormality (8.3%, 5 cases) (23).

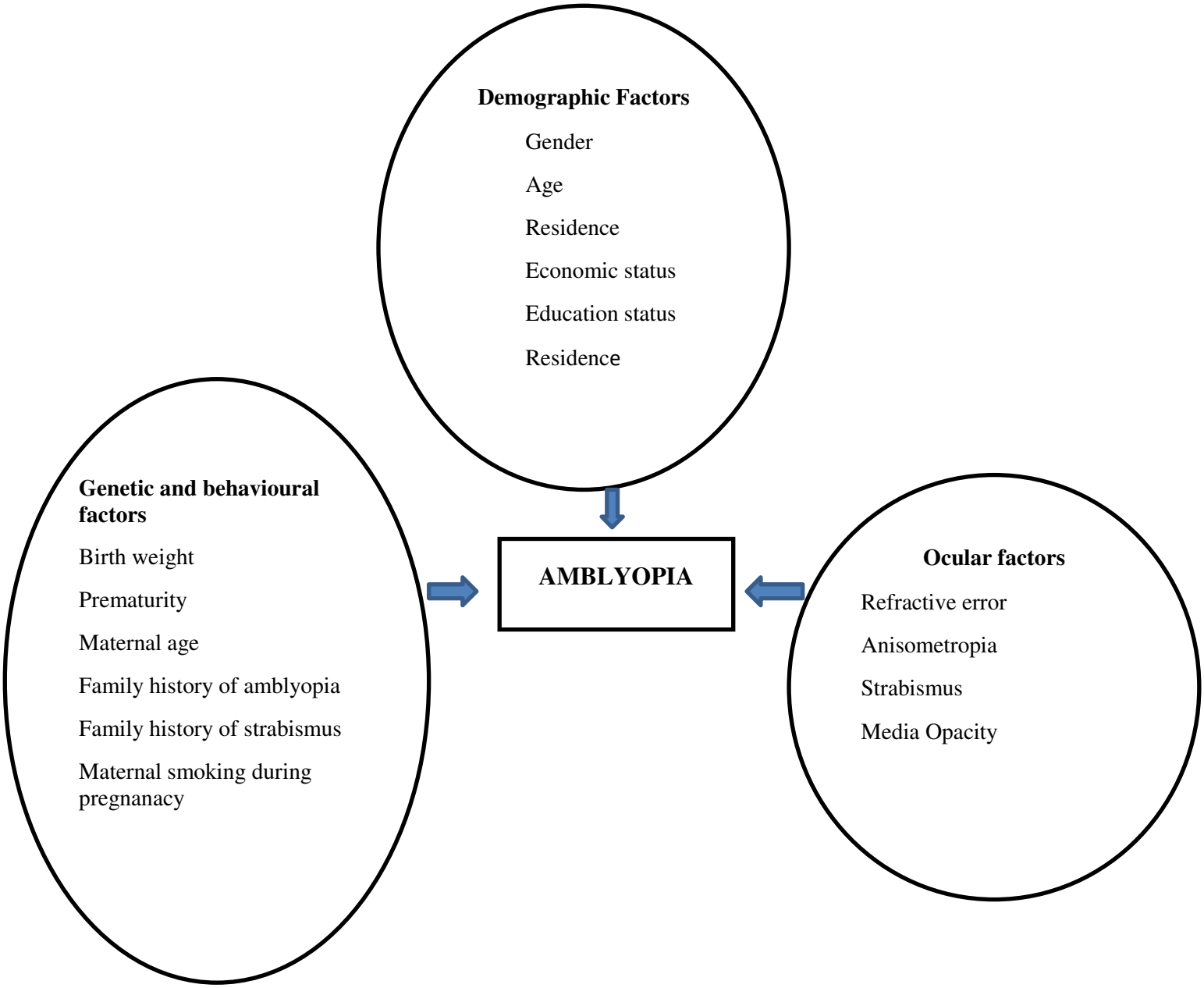
Between November 2020 and April 2021, a hospital-based, cross-sectional study was conducted at Hawassa University Comprehensive Specialized Hospital Pediatric Eye Outpatient Department. The study found that the proportion of amblyopia was 23.8%. Among the different age groups, children aged 5-9 years had the highest proportion of amblyopia at 27.67%. The

study also identified specific risk factors associated with a higher prevalence of amblyopia, including anisometropia (75.75%), strabismus (56.52%), refractive error (41.41%), and media opacity (37.50%). Most children had unaided visual acuity of 6/6 in both their right (46.50%) and left (50.50%) eyes. Additionally, the majority had best-corrected visual acuity (BCVA) of 6/6 in their right (64.90%) and left (65.3%) eyes. The study noted that hyperopia and constant strabismus were particularly associated with a higher proportion of amblyopia in both the right and left eyes (22).

During the period of January to June 2007, a cross-sectional study was conducted at a Pediatric Ophthalmology clinic in Menilik II Hospital. Out of the 2,020 children examined, 183 children below the age of 15 were identified with amblyopia, resulting in a proportion of 9.1%. Of the amblyopic children, 91 (49.7%) were male and 92 (50.3%) were female. The majority of the children (72.1%) lived in Addis Ababa, while the remaining 27.9% came from other parts of Ethiopia. The average ages of presentation for different types of amblyopia were 6.2 ± 3.2 years for combined amblyopia, 6.8 ± 2.9 years for strabismic amblyopia, 7.4 ± 3.9 years for anisometropic amblyopia, and 7.5 ± 3.1 years for sensory deprivation amblyopia. The median age for strabismic amblyopia was 7 years, while it was 5 years for combined and anisometropic amblyopia (21).

Conceptual Framework

Figure 1: Conceptual frame work on factors associate with amblyopia (Adapted)



3. Objectives

3.1. General Objectives

- To assess the prevalence and associated factors of amblyopia among children presenting to the pediatric ophthalmic clinic of St. Paul's Hospital Millennium Medical College.

3.2. Specific Objectives

- To assess the prevalence of amblyopia among children who are between the ages of 3 to 15 years.
- To identify associated factors of amblyopia among children who are between the ages of 3 to 15 years.

4. Methods and Materials

4.1. Study Setting

The study is conducted at pediatric ophthalmic clinic of St. Paul's Hospital Millennium Medical college; Addis Ababa, Ethiopia. The college is a medical college based on a tertiary hospital located in the Gulele sub city in Addis Ababa. A medical school, the Millennium Medical College was opened in 2007 Ethiopian Calendar (which is 7 or 8 years behind the Gregorian calendar) (40). Students admitted from each region of the country are required to pass written ERMP exam. The ophthalmology center of SPHMMC is organized in to different clinics: optometry, pediatrics ophthalmology and strabismus, general OPD, anterior segment, glaucoma, oculoplastics and retina. Ophthalmology specialty training has been in progress for the past 10 years. The POC clinic is functional with 2 sub-specialists and residents in training. The yearly patient load in the Pediatric ophthalmology department is 6990. This includes a total of 4386 patients in the age range of 3 and 15 years.

4.2. Study Design

A cross sectional study design is used. The study was conducted from September 2024 to August 2025.

4.3. Source Population

All patients visiting the pediatric ophthalmology outpatient department at SPHMMC.

4.4. Study Population

Patients age from 3 years to 15 years visiting the POC during September 2024 to August 2025.

4.5. Inclusion and Exclusion Criteria

Inclusion criteria:

- Patients aged 3 to 15 years who visit POC at SPHMMC during the study period and whose parents assent to be in the study were included.

Exclusion criteria

- Children with recent ocular trauma
- Children with recent ocular surgery
- Children who are uncooperative for examination
- Children who are Allergic to 1% cyclopentolate or ingredients of it

4.6. Sample Size Determination and Sampling Technique

4.6.1. Sample size calculation for the first objective

Sample size determination for the dependent variable using single population formula from previous study done at Hawassa University Comprehensive Specialized Hospital.

$$n = \frac{(z_{\alpha/2})^2 p(1-p)}{d^2}$$

Where n = sample size calculated Z = level of significance ≈d = margin of error, p=23.81%

Gebru, E.A., Alem, K.D. and G/Silassie, M.G, 2022)

n = (1.96) 2 *(0.2381*0.7619)/ (0.05) 2 n = 278.7≈279.

4.6.2. Sample size calculation for the associated factors of Amblyopia

The sample size for the associated factors was calculated using two population proportion formula by using EPI Info Version 7.2.4.0 software. From previous study done at Hawassa University Comprehensive Specialized Hospitalet Age 5 to 9 years, Anisometropia, Strabismus, Refractive Error and Media opacity were significantly associated with Amblyopia (22).

Table 1. Summary of sample size calculation for associated factors of Amblyopia

Variables	P1	P2	P	CI	Sample size
Age 5-9 years	27.67%	18.88%	80%	95%	776
Anisometropia	75.75%	13.61%	80%	95%	24
Strabismus	56.52%	19.55%	80%	95%	64
Refractive error	41.41	6.79%	80%	95%	58
Media Opacity	37.50	22.58%	80%	95%	322

P1-Percent of cases with exposure, P2- Percent of cases with control, P- Power, CI- confidence Interval, R- Ratio of sample size controls to cases

The highest sample size for the associated factors is 776, which is higher than the value we got from the single population formula.

Finally, we calculate the sample size corresponding to our population size using the following formula

Final sample size(n)=N*SS/(SS+N-1), N=Population size=4386, SS- sample size

n=776*4386/(4386+776-1)

n=659.47~660 By taking the non-respondent rate of 10% = 83.4, our sample size will be n = ~726

4.6.3. Sampling Procedure

We employed the systematic random sampling method to obtain a total of 726 samples per year. This means we need to collect 14 samples per week. The designated days for patient visits are Monday, Wednesday, and Friday, on which both new and follow-up patients are seen. Our data collection approach will involve gathering 5 data points on each of these three days. In the previous year's report, it was found that a total of 4,386 patients between the ages of 3 and 15 visited the outpatient department (OPD) annually. This translates to an average of 24 patients being evaluated each day within this age group when the OPD is open. Therefore, we plan to collect data by randomly selecting a starting point and then including every fifth patient who visits the OPD within the age group of 3 to 15 years.

4.7. Variables of the Study

4.7.1 Dependent Variables

- Presence of Amblyopia

4.7.2. Independent Variables

- **Ocular Conditions**
  - Hyperopia
  - Myopia
  - Astigmatism
  - Heterotropia/Hetrophoria
  - Anisometropia
  - Cause of sensory deprivation (ptosis, cataract, or cornea opacity)
- **Socio-demographic variables**
  - Age
  - Sex
  - Residence
  - Parental level of education
  - Parental Level of income

- **Behavioral, Genetic and amblyopia related Factor**
    - Birth weight
    - History of prematurity
    - Maternal age on childbearing
    - Maternal smoking during pregnancy
    - Family history of strabismus
    - History of preschool screening

4.8. Operational Definitions

Pediatrics- Age group of population ≤15 years (41).

Amblyopia -Best corrected visual acuity of poorer than 6/9 in either one or both eyes in the absence of any pathological ocular disorders (2, 3).

Refractive Error -Child having ≥+1.50DS hyperopia, ≥-0.75DS myopia and/or ≥±1.50DC astigmatism in either one or both eyes (42).

Meridional (Astigmatism) Amblyopia- Amblyopia occurs when there is a regular astigmatism of >1.5 DC on any meridian (21).

Strabismic amblyopia- Amblyopia in the presence of ocular misalignment but in the absence of refractive error (43).

Anisometropic Amblyopia -Amblyopia occurs when there is uncorrected refractive error in which the difference between the corresponding major meridians is greater than −3.00 DS myopia, greater than or equal to +1.50 DS hyperopia and greater than ±2.00 D of astigmatism (43).

Isometropic Amblyopia- High refractive error in both eyes, for myopic greater than-6.00 DS, for hyperopic greater than +5.00 DS and for astigmatism greater than ±2.50 DC (43).

Sensory Deprivation Amblyopia- Amblyopia occurs when there is known ocular diagnosis like ptosis, cataract, corneal opacity or VH (43).

Mixed Amblyopia - Amblyopia having more than one amblyogenic factors (44).

4.8. Data Collection Tools and Techniques

The collection of data for this study involved conducting face-to-face interviews using structured questionnaires during the initial visit. The questionnaires consisted of three parts, covering socio-demographic variables, ocular risk factors, and genetic, behavioral, and environmental factors. These questionnaires were prepared in both Amharic and English languages.

In addition to the interviews, various ocular examinations were conducted. These examinations included assessing the uncorrected visual acuity (UCVA) and beSst-corrected VA (BCVA) using Snellen's visual acuity chart for those above 4 years of age and CSM for 3 and 4 years old. Ocular alignment was evaluated, and slit lamp examinations performed to check for any anterior and posterior segment pathology. Furthermore, cycloplegic refraction under cyclopentolate 1% eye drop was carried out.

The data collection process involved a team of professionals, including 2 nurses, 4 residents, and 2 optometrists, who actively participated in conducting physical examinations and collecting the required data. As the supervisor, I coordinated the whole data collection process.

To ensure a smooth and efficient data collection process, the data collectors received orientation sessions. These sessions familiarized them with the study objectives, protocols, and ethical considerations. Additionally, they were trained on the specific clinical measurements and techniques that were utilized during data collection.

Throughout the data collection process, close supervision were maintained to ensure adherence to standardized procedures. This supervision addressed any queries or concerns that may arose. Regular meetings and discussions were conducted to provide feedback to the team, address challenges, and uphold the quality of data collection.

4.9. Quality Control Measures

To ensure the reliability and validity of the questionnaires, a pretest was conducted. This involved administering the questionnaires to 46 participants who were similar to the target population and these participants were excluded from the main study. The responses and feedback from the pretest were carefully reviewed and necessary adjustments were made to the questionnaires to improve clarity and relevance.

After the pretesting phase, the questionnaires were thoroughly checked to ensure that they are error-free and ready for use with the actual study participants. This included reviewing the formatting, sequencing, and wording of the questions to minimize any potential biases or ambiguities.

4.10. Data Analysis

Once the data collection was completed, the collected data underwent quantitative data analysis. To analyze the data, it was entered into Epi-Data software, and the analysis was conducted using SPSS version 26.

The analysis involved exploring the factors associated with amblyopia through multivariable binary logistic regression. This statistical method allows for the examination of multiple variables simultaneously to identify significant associations with the occurrence of amblyopia. In determining the significance of associations, a p-value of less than 0.05 was considered. If the p-value is below this threshold, it indicates a statistically significant association between the examined factors and the presence of amblyopia.

By employing these quantitative data analysis techniques, the study uncovered and understand the factors that are associated with amblyopia, providing valuable insights into this condition.

4.11. Dissemination Plan

The results of the study will be presented during the research defense and the document will be submitted to the school of medicine and college registrar office. It will also be present in various scientific conferences. In addition, all efforts will be done to publish its findings in a reputable medical journal.

4.12. Ethical Considerations

The research was conducted after the proposal got accepted by the Ophthalmology department. Ethical clearance letter was obtained from IRB of SPHMMC. The parents of the children participating in the research were required to fill the assent at the first page of the questionnaire. The identity of the study subjects were kept confidential throughout the study.

5. Results

5.1.Descriptive Statistics

5.1.1. Socio-demographic Characteristics of Study Participants

A total of 751 children participated in this study, with slightly more males (53.79%, n=404) than females (46.21%, n=347). The mean age of participants was 7.54 ± 3.41 years (range: 3-15 years). The majority of participants were from urban areas (63.78%, n=479), while 36.22% (n=272) were from rural areas. Age distribution showed that the largest proportion of participants were of school age, 6-10 years (43.68%, n=328), followed by preschool children aged 3-5 years (34.22%, n=257), and adolescents aged 11-15 years (22.10%, n=166). The mean age of symptom onset for the amblyopic children is 4.73 years, while the mean age of presentation to the hospital is 6.28 years.

Table 2:Socio-demographic Characteristics of Study Participants (N=751)

Characteristic	Category	Frequency	Percentage
Sex	Female	347	46.21%
	Male	404	53.79%
Age Group	3-5 years	257	34.22%
	6-10 years	328	43.68%
	11-15 years	166	22.10%
Residence	Rural	272	36.22%
	Urban	479	63.78%
Age (years)	Mean ± SD	7.54 ± 3.41	Range: 3-15
Age of symptom onset	Mean ± SD	4.73 ± 3.17	Range: 0-14
Age of presentation	Mean ± SD	6.28 ± 3.42	Range: 0.3-14

5.1.2. Prevalence of Amblyopia

The overall prevalence of amblyopia among children visiting the POC was 30.36% (228 out of 751 children). Out of these 228 children 32 have bilateral amblyopia.

The prevalence of amblyopia varied across different socio-demographic groups. There was no significant gender difference in amblyopia prevalence (p=0.709), with 29.68% prevalence among females (103/347) and 30.94% among males (125/404).

However, the prevalence of amblyopia showed a strong and statistically significant inverse relationship with age (p<0.001). The highest burden was found in preschool children aged 3-5 years (41.25%, 106/257). The prevalence was markedly lower in school-age children (6-10 years) at 28.35% (93/328), and lowest among adolescents (11-15 years) at 17.47% (29/166). In addition, Rural residents had a significantly higher prevalence of amblyopia (36.03%, 98/272) compared to urban residents (27.14%, 130/479) (p=0.011).

Table 3:Prevalence of Amblyopia by Socio-demographic Characteristics

Characteristic	Category	Total N	Amblyopia Cases	Prevalence	p-value
Sex	Female	347	103	29.68%	0.709
	Male	404	125	30.94%	
Age Group	3-5 years	257	106	41.24%	0.000
	6-10 years	328	93	28.35%	
	11-15 years	166	29	17.47%	
Residence	Rural	272	98	36.03%	0.011
	Urban	479	130	27.14%	

5.1.3. Clinical Characteristics and Risk Factors

Children with refractive errors had a dramatically higher prevalence of amblyopia (51.63%, 222/430) compared to those without refractive errors (1.87%, 6/321) ($p<0.001$). Strabismus showed the strongest association with amblyopia, with 88.73% (126/142) of children with strabismus developing amblyopia, compared to only 16.75% (102/609) of those without strabismus ($p<0.001$). Family history of eye conditions (strabismus, RE or amblyopia) was also significantly associated with higher amblyopia prevalence (43.64% vs 28.08%, $p=0.001$).

Table 4: Clinical Characteristics and associated factors of Amblyopia among children visiting POC at SPHMMC

Clinical Factor	Category	Total N	Amblyopia Cases	Prevalence	p-value
Refractive Error	Absent	321	6	1.87%	<0.001
	Present	430	222	51.63%	
Strabismus	Absent	609	102	16.75%	<0.001
	Present	142	126	88.73%	
Family History	Absent	641	180	28.08%	0.001
	Present	110	48	43.64%	

5.1.4. Common Presenting Symptoms

The most common presenting symptom was eye deviation (44.25%, n=258), followed by decreased vision (21.27%, n=124). Asthenopia, opacity in the eye, nystagmus, dropping of the upper eye lid, together with other symptoms accounted for 34,48% of the presentations.

Table 5:Distribution of common Presenting Symptoms (N=583 with recorded symptoms)

Presenting Symptom	Frequency	Percentage
Eye Deviation	258	44.25%
Decreased Vision	124	21.27%
Other	173	29.67%
Asthenopia	6	1.03%
Eye Deviation + Decreased Vision	8	1.37%
Opacity in the Eye	8	1.37%
Nystagmus	3	0.51%
Drooping of Upper Lid	3	0.51%

5.1.5. Types of Amblyopia

Among the 228 children with amblyopia, strabismic amblyopia was the most common type (73.68%, n=168), followed by isometropic amblyopia (57.46%, n=131), and mixed amblyopia (42.98%, n=98). Anisometropic amblyopia was present in 27.19% (n=62), meridional amblyopia in 18.86% (n=43), and deprivational amblyopia was the least common at 4.82% (n=11).

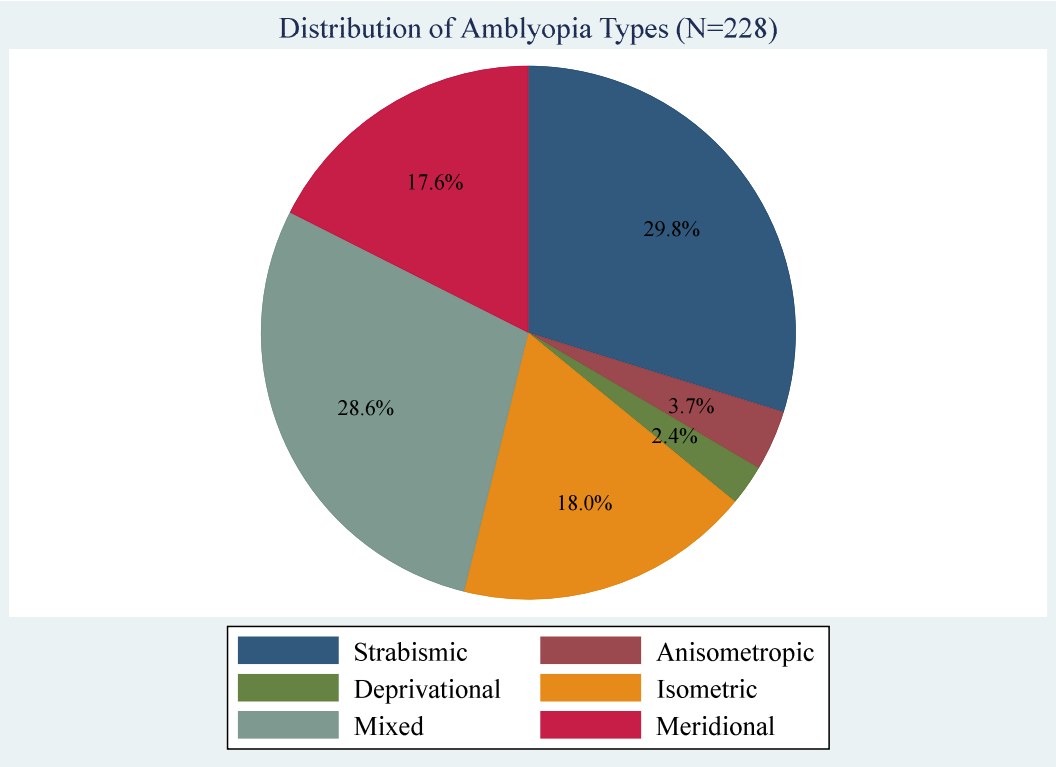


Figure 2: Types of Amblyopia

5.2. Inferential Analysis

5.2.1. Univariate Logistic Regression Analysis

Univariate logistic regression was performed to assess the association between various factors and amblyopia. The results revealed several significant risk factors.

In univariate analysis, preschool children (3-5 years) had 3.32 times higher odds (95% CI: 2.07–5.31, p<0.001) of having amblyopia. School-age children (6-10 years) also had significantly higher odds (OR=1.87, 95% CI: 1.17–2.98, p=0.009) compared to adolescent age groups (11-15 years). Urban residence was protective against amblyopia (OR=0.66, 95% CI: 0.48-0.91, p=0.011). Refractive error showed the strongest association with amblyopia (OR=56.03, 95% CI: 24.44-128.45, p<0.001), followed by strabismus (OR=39.14, 95% CI: 22.31-68.66, p<0.001). Family history also significantly increased the odds of amblyopia (OR=1.98, 95% CI: 1.31-3.00, p=0.001).

Table 6: Bivariate Logistic Regression Analysis of Factors Associated with Amblyopia (N=747)

Factor	Category	Crude Odds Ratio (COR)	95% CI	p-value
Sex	Male	1.06	0.78 - 1.45	0.709
Age Group	3-5 years	3.32	2.07- 5.31	0.000
	6-10 years	1.87	1.17 - 2.98	0.009
Residence	Urban	0.66	0.48 - 0.91	0.011
Income Category	Medium	1.82	0.49 - 6.84	0.372
	High	1.93	0.54 - 6.84	0.310
Refractive Error	Present	56.03	24.44 - 128.45	<0.001
Strabismus	Present	39.14	22.31 - 68.66	<0.001
Family History	Present	1.98	1.31 - 3.00	0.001
Cataract History	Present	2.35	0.67 - 8.20	0.180

5.2.2. Multivariate Analysis

Variables with a p-value <0.25 in univariate logistic regression analysis were considered candidates for inclusion in the multivariable logistic regression model. After adjusting for all covariates in the multivariate model, refractive error remained the strongest independent predictor of amblyopia (aOR=39.64; 95% CI: 16.00–98.18, p<0.001), followed by strabismus (aOR=24.91; 95% CI: 12.96–47.88, p<0.001) and cataract history (aOR=15.14;95% CI: 2.34–97.77, p=0.004). After adjustment, neither the school-age group (aOR=1.03, p=0.922) nor the preschool group (aOR=0.59, p=0.106) showed significantly different odds of amblyopia compared to adolescents. This indicates that the powerful effect of young age observed in the bi-variate model is largely mediated through its strong association with the clinical risk factors of refractive error and strabismus.

Table 7:Multivariate Logistic Regression Analysis of Factors Associated with Amblyopia

Factor	Category	Adjusted Odds Ratio (aOR)	95% CI	p-value
Sex	Male	1.39	0.84 – 2.28	0.197
Age Group	3-5 years	0.59	0.31 – 1.12	0.106
	6-10 years	1.03	0.62 – 1.70	0.922
Residence	Urban	1.59	0.95 – 2.67	0.077
Family Income	10k-30k Birr	0.36	0.07 – 1.86	0.221
	>30k Birr	0.36	0.08 – 1.64	0.185
Refractive Error	Present	39.64	16.00 – 98.18	<0.001
Strabismus	Present	24.91	12.96 – 47.88	<0.001
Family History of Eye Conditions	Present	1.07	0.59 – 1.93	0.824
History of Cataract	Present	15.14	2.34 – 97.77	0.004
Constant		0.001	0.0001 – 0.020	<0.001

6. Discussion

This study provides a critical snapshot of the burden and determinants of amblyopia among children presenting to the Ophthalmology department of a major tertiary hospital in Ethiopia. The findings reveal a high prevalence of the condition, elucidate its strong association with specific clinical risk factors, and highlight important demographic patterns that warrant public health attention.

Prevalence and its implications

The overall prevalence of amblyopia was found to be 30.36% (CI: 27.1%–33.8%). This figure is substantially higher than rates reported in general population-based studies from high-income countries, which typically range from 1% to 5 (16). However, it aligns closely with, or even exceeds, prevalence figures from other hospital-based studies in similar low-resource settings. For instance, a study from Nigeria reported the prevalence of amblyopia as 22.4% among pediatric ophthalmology clinic attendees (39). The higher prevalence rate in our study is expected, as the sample is drawn from a tertiary referral center, thereby capturing a disproportionate number of children with significant ocular morbidity. This underscores the role of such institutions as critical sentinel sites for detecting severe and often late-presenting cases of amblyopia.

The main cause of amblyopia varies between studies, depending on the characteristics of the study sample and how amblyopia is defined. In our study strabismic amblyopia is the most common type. In a study done at Minlik II referal hospital the proportion of types of causes of amblyopia were strabismus in 39.3%, combined in 27.3% and anisometropic 6.0% of the cases (24). In studies done in India and Pakistan also most of the children had strabismic amblyopia (45, 46). In a study done at Hawassa referral hospital most of the children had anisometropic amblyopia 15 (31.25%) followed by meridional 10 (20.83%), mixed 8 (16.67%) (25). This discrepancy is most likely due to differences in the source population. The study at Hawassa refferal hospital included children 5- 15 years of age but this study included children 3–15 years of age.

Demographic Patterns

The demographic analysis revealed critical patterns. The absence of gender association aligns with most global literature, suggesting a biologically equivalent susceptibility between the sexes (19).

The peak age in prevalence of amblyopia is different for different studies depending on the study population and age groups included in researches (33, 36). In our study the peak age is 3-5 years. In a study done in Hawasa Referral hospital the proportion of amblyopia was highest for age group of 5–9 years (22). In our study the younger the age the likely of being amblyopic increases that may be attributed to younger age necessitates more frequent follow-up protocols, which consequently results in a higher number of young amblyopic patients actively engaged in our follow-up schedule (52).

Furthermore, the significantly higher univariate prevalence among rural children (36.03% vs. 27.14% in urban dwellers) signals a potential healthcare access disparity. Geographic and socioeconomic barriers in rural areas may delay presentation, leading to a longer duration of uncorrected refractive error, strabismus or cataract which in turn increases the severity and likelihood of entrenched amblyopia by the time the child reaches tertiary care (47). This finding tells us the need for decentralized vision screening and strengthened referral pathways from rural communities.

Dominant Clinical Risk Factors

These findings reiterate a fundamental point: the timely detection and correction of refractive error and the early management of strabismus are the most effective strategies for amblyopia prevention.

A particularly salient finding was the strong independent association of a history of pediatric cataract with amblyopia (aOR=15.1). This quantifies the profound and lasting risk of deprivation amblyopia caused by cataract, as the visual deprivation occurs during the critical developmental period. It highlights that the removal of the opacity, while necessary, is insufficient to reverse the established amblyogenic risk; timely surgery, intensive, compliant post-operative rehabilitation with optical correction and occlusion therapy remains paramount to visual recovery (53). This

result mandates that a pediatric cataract diagnosis be viewed not as a simple surgical problem, but as the first step in a long-term amblyopia management journey.

A nuanced and important insight from the full multivariable logistic regression model was the attenuation of the age effect. When refractive error, strabismus, and cataract history were accounted for, the odds ratios for the younger age groups lost statistical significance. This indicates that younger age is not a direct risk factor per se, but rather a powerful proxy and mediator. The heightened prevalence in preschoolers is primarily driven by the higher prevalence or more potent impact of these clinical amblyogenic conditions during the peak of the sensitive period. This statistical mediation underscores a crucial public health message: targeting the clinical conditions (refractive error, strabismus) will effectively address the demographic burden.

7. Conclusion

This study revealed a high burden of amblyopia(30.36%) among children attending the Ophthalmology department at St. Paul's Hospital Millennium Medical College. The prevalence was significantly higher among children aged 3-4 years and among rural residents in univariate analysis, though residence lost significance after adjustment.

The key independent predictors of amblyopia identified were Refractive error**,** Strabismus, and History of cataract surgery. Strabismic amblyopia and isometropic amblyopia were the most common types, with considerable overlap (mixed amblyopia).

These findings confirm that untreated refractive error and strabismus are the primary drivers of amblyopia in this population, with rural children disproportionately affected due to likely barriers in accessing early eye care services.

8. Recommendations

Based on the specific gaps identified in this study, the following recommendations are proposed.

The high prevalence of amblyopia among rural children indicates poor access to eye care. Regional Health Bureaus and District Health Offices, in collaboration with SPHMMC, should establish outreach eye screening programs targeting preschool-aged children in rural districts.

The Ministry of Education and Ministry of Health should integrate school-based refractive error screening and spectacles provision into the school health program, with teachers trained to identify children with poor vision.

The Department of Ophthalmology at SPHMMC should develop public awareness campaigns on early strabismus detection, while Health Extension Workers are trained to recognize and refer visible eye deviations.

. The Ministry of Health should mandate universal preschool vision screening at immunization centers and well-child clinics for children aged 3-4 years.

SPHMMC and Regional Referral Hospitals should establish structured, long-term follow-up protocols for children with cataract history. Strengthening community-based and school vision screening programmes is paramount to facilitate early detection (51).

In summary, the Ministry of Health must prioritize preschool vision screening; Regional Health Bureaus must deploy rural outreach services; and SPHMMC must lead training, develop pediatric cataract protocols, and generate local evidence through research.

9. Strengths of the study

The study has large sample size (n = 751) which increases the statistical power.

We used systematic random sampling minimizing selection bias. Standardized and comprehensive ophthalmic examination was applied an this dictates high quality data.

10. Limitations of the study

As a hospital-based cross-sectional study, the prevalence estimate cannot be generalized to the broader community population, as it is inherently subject to referral bias. The findings of this study must be interpreted within its methodological context. The calculated prevalence reflects the clinical burden at a referral center and is influenced by referral patterns, follow-up protocols, and discharge criteria. It should not be equated with the true epidemiological prevalence of amblyopia in the community. The cross-sectional design, counting all OPD visits, inherently over-represents age groups undergoing more frequent monitoring. Future research. employing a longitudinal design or unique patient tracking over a defined period would help mitigate this bias and more accurately delineate incidence.

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Annex I: Conceptual framework

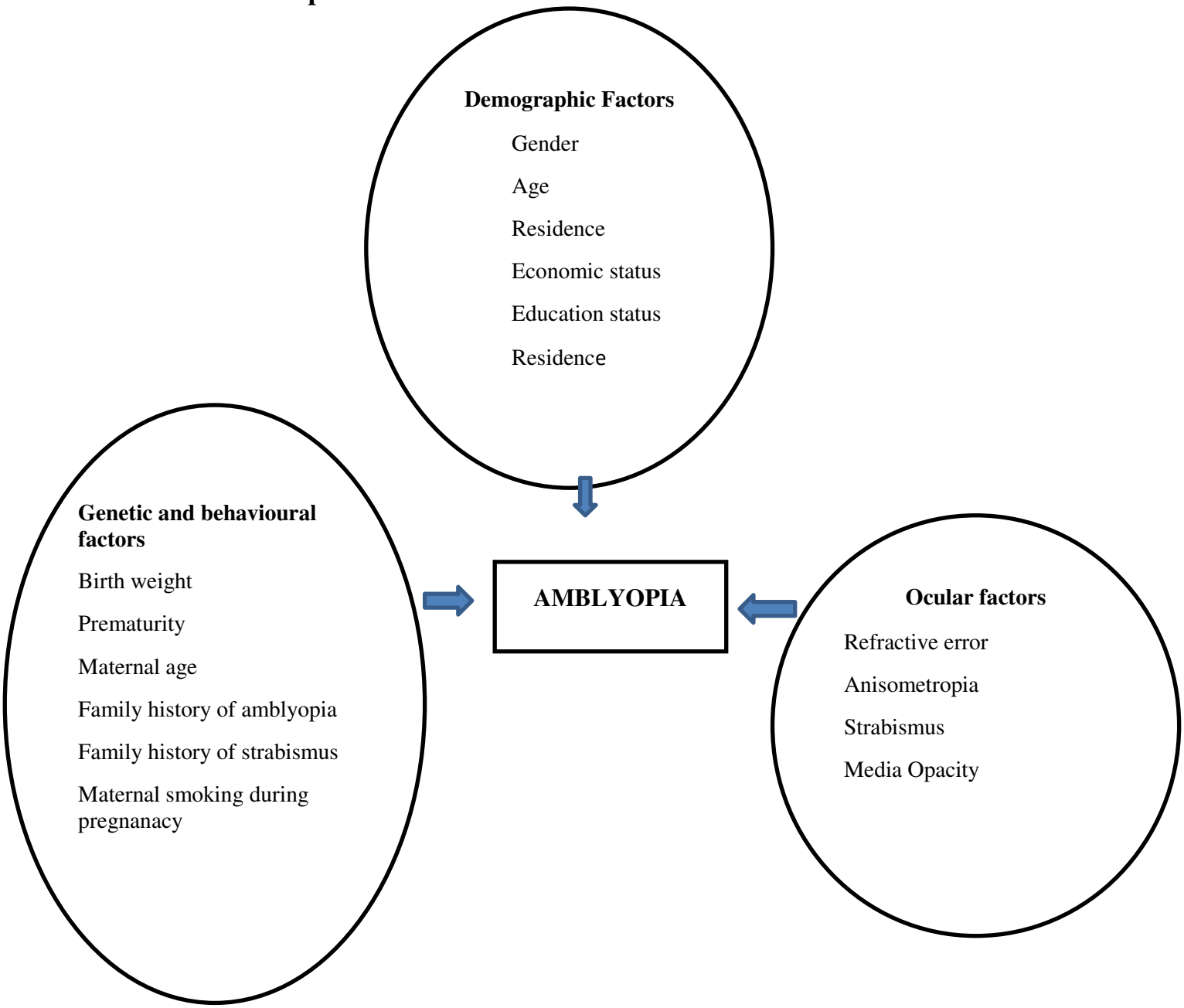

Figure 1: Conceptual frame work on factors associate with amblyopia(Adapted)

Annex II. Information Sheet and consent form (English Version)

PARTICIPANT INFORMATION SHEET

Hello, how are you? My name is _____.I am working as a data collector on behalf of Munteha Jelalu(MD) who is an Ophthalmology resident at SPHMMC who want to conduct this survey. This information sheet is prepared to explain the Purpose of this research in order to get your willingness to participate in the study. Please take time to listen the following information carefully. Ask questions if anything you listen is not clear or would like more information. Take time to decide whether or not to take part.

The study title: The prevalence of Amblyopia and associated factor among patients attending pediatric ophthalmology clinic at SPHMMC, Addis Ababa, Ethiopia.

Purpose of the study: This study will seek to assess the prevalence and associated factor of Amblyopia and to write a thesis as a partial fulfillment of specialty degree in Ophthalmology.

Procedure: If you are willing to participate in the research, you need to sign the consent form .then; your child will be interviewed and examined for the presence of Amblyopia by the data collectors and this may take 30 minutes to 1 hour.

Benefits: The study does not have direct financial or health care benefit to the participants. But indirectly the results from the study will help the policy makers, practitioners and concerned organizations to formulate strategy for improving Amblyopia treatment and prevention.

Risk: It will take about 30 minutes to 1 hour of your time otherwise there are no anticipated risk to the participants, does not cause any physical harm, social discrimination or economic loss.

Confidentiality: All information will be kept with extreme confidentiality and shall not be divulged to any unauthorized person. Your identification (name, house number, phone number) will not be recorded on the questionnaire.

Rights to decline: Taking part in the study is voluntary and each participant has right to decline or withdraw at any stage of the research. You will not be denied the right of care for not participating.

For more information and question; here is the contact address of investigator;

Munteha Jelalu (MD) Tel: 0938109380 Email: muntesemer100@gmail.com

Thank you for taking the time to consider this study.

Ascent Form (for participants whose age is from 10 to 18)

My name is _____. I am asking you to take part in this research study because we are trying to learn more about Amblyopia. If you agree to be in this study, you will be asked some questions and examined for amblyopia. You talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes", you can still decide not to do this. If you don't want to be in this study, you don't have to be. Remember, being in this study is up to you. You can ask any questions that you have about the study at any time. If you think of a question later, you or your parents can contact me at Tel: 0938109380. You may stop being in the study at any time. Sign this form only if you:

• have understood what you will be doing for this study,

• have had all your questions answered,

• have talked to your parent(s)/legal guardian about this project, and

•agree to take part in this research

Date: _____ Signature of the Volunteer_____

Name of interviewer_____ Signature _____

Consent form for parents/guardians of participants whose age is less than 18years

I have been asked to give consent for my daughter/son to participate in this research study. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and my questions have been answered to my satisfaction. I consent voluntarily for my child to participate as a participant in this study.

Print Name of Parent/Guardian _____Signature of Parent /Guardian_____

Date _____

Annex III: Information sheet and consent form (Amharic version)

ለተሳታፊዎች ስለ ጥናቱ መረጃ የሚሰጥ ቅጽ

ጤና ይስጥልኝ

እኔ……የአይን ህክምና ተማሪ ለሆነችው ዶ/ር ሙንተሃጀላሉ በቅዱስ ጳውሎስ ሆስፒታል ስለ የአይንስንፈት በሽታ ስፋት እና ተያያዥ ጉዳዮችን ለማወቅ በሚሰራው ጥናት ላይ መረጃ በመሰብሰብ ላይ እገኛለው:: እርሶም በምናደርገዉ ጥናት ላይ እንዲሳተፉ ተጋብዘዋል፡፡ይህ ቅጽ የተዘጋጀው ለመሳተፍ ከመወሰንዎ በፊት ስለ ጥናቱ መረጃ ለመስጠት ነው፡፡ጊዜ ወስደው ቀጥሎ ያሉትን ሃሳቦች በጥሞና ለማድመጥ ይዘጋጁ፡ ግልጽ ያልሆነ ነገር ካለ ጥያቄ መጠየቅ ይችላሉ፡፡ትንሽ ጊዜ ወስደው በጥናቱ መሳተፍ መቻል/አለመቻሎን ያሳውቁን:: ፍቃደኛ ከሆኑ ከዚህ ቀጥሎ የሚኖረውን የተስማሚነት ቅጽ መፈረም ይኖርቦታል፡፡

የጥናቱ ርእስ፡ በአዲስ አበባ ውስጥ በሚገኘው በቅዱስ ጳውሎስ ሆስፒታል የህጻናትየአይን ህክምና ክፍል የአይን ስንፈት በሽታ እና ተያያዥ ጉዳዮች

የጥናቱ ዓላማ፡ በአዲስ አበባ ውስጥ በሚገኘው በቅዱስ ጳውሎስ ሆስፒታል የአይንስንፈት በሽታስፋት እና ተያያዥ ጉዳዮችን ለመገምገም

የጥናቱ አካሄድ፡ በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ከሆኑ ፣የስምምነት ቅጽ ላይ ይፍርሙና፣15 ደቂቃ የሚፈጅ ቃለ መጠይቅ ያደርጋሉ፡፡ በተጨማሪም የአይንስንፈት በሽታመኖር አለመኖሩን በመረጃ ሰብሳቢው ይጣራል፡፡

የጥናቱ ጥቅም፡ በዚህ ጥናት በመሳተፍዎ ክፍያ ወይም ሌላ አይነት ቀጥተኛ ጥቅም አያገኙም ፤ ነገር ግን ለጥናቱ ውጤታማነትና አላማ መሳካት ታላቅ ጠቀሜታ አለው፡፡ በመጨረሻም ከዚህ ጥናት የሚገኘው የአይንስንፈት በሽታ ላይ ባለሙያዎች በማስረጃ የተደገፈ እቅድ ለማቀድና፣አገልግሎቱን ለሚሰጡ የጤና ባለሙያዎች ጥራት ላለው ተጨማሪ አገልግሎት የመረጃ ግብዓት ሆኖ ያገለግላል ተብሎ ይታሰባል ፡፡ እንዲሁም ውደፊት ከዚህ ተመሳሳይ ጥናት ለሚያደርጉ ምሁራን ጥልቅ ጥናት ለማድረግ የሚያስችል መረጃ ይሆናል፡፡

ከጥናቱ ጋር ሊኖር የሚችል ጉዳት ፡ በዚህ ጥናት ላይ በመሳተፍዎ ችግር ይፈጠራል ውይም ጉዳት አለው ብለን የምንሰጋዉ ነገር የለም፡፡ነገር ግን ከጊዜዎት ላይ ወደ 30 ደቂቃ እስከ ሰአት ይወስድቦታል፡፡ በዚህ ጥናት ላይ አለመሳተፍ በሚያገኙት አገልግሎት ላይ የሚያደርሰው ጉዳት የለም፡፡

ሚስጢራዊነት፡ ይህ ከእርሶ የሚሰበሰበዉ መረጃ ሚስጢራዊነቱ የተጠበቀ ነዉ፡፡በጥናቱ ላይ የእርስዎን አድራሻም ሆነ ስም የማንጠቅስ መሆኑን እንገልፃለን፡፡

በጥናቱ ያለመሳተፍ ወይም አቋርጦ የመውጣት መብት፡ በዚህ ጥናት ላይ መሳተፍ በፍጹም ፍቃደኝነት ላይ የተመሠረተ ነው፡፡ ስለሆነም ያለመሳተፍ ሙሉ መብት አሎት እንዲሁም በመጠይቁ መሳተፍ ከጀመሩ በኋላ አንዳነድ ጥያቄዎችን አለመመለስ ሆነ በማንኛውም ሰዓት ማቋረጥ ይችላሉ ፡፡

ለተጨማሪ መረጃ፡ በዚህ ጥናት ላይ ተጨማሪ መረጃ ከፈለጉ የጥናቱ ባለቤት ዶ/ርሙንተሃጀላሉን በስልክ ቁጥር+251938109380 ወይም ኢ-ሚይል muntesemer100@gmail.com ሊያገኙን ይችላሉ፡፡

ስለዚህ መረጃውን ለመስጠት እና በዚህ ጥናት ተሳታፊ አንዲሆኑልኝ በአክብሮት እጠይቀዎታለሁኝ፡፡

የስምምነት ማረጋገጫ ቅጽ (እድሜአቸው ከ10-18 ለሆኑ)

ሰላም እኔ..... እባላለሁ፡፡ የአይን ህክምና ተማሪ ለሆነችው ዶ/ር ሙንተሃጀላሉ በቅዱስ ጳውሎስ ሆስፒታል ስለ የአይን ስንፈት እና ተያያዥ ጉዳዮችን ለማወቅ በሚሰራው ጥናት ላይ መረጃ በመሰብሰብ ላይ እገኛለው፡፡ በዚህ ጥናት ላይ እንዲሳተፉ እምጠይቆት ስለ የአይን ስንፈት በሰፊው ለማወቅ ሲሆን በዚህ ጥናት ላይ ለመሳተፍ ፍቃደኛ ከሆኑ የተወሰኑ ጥያቄ ይጠየቃሉ ፡፡ ይህንንም ከቤተሰብዎ ጋር ተነጋግረው ይወስናሉ፡፡ ስለመሳተፍዎ ቤተሰብዎንም ፍቃድ እንጠይቃለን፡፡ ነገር ግን ቤተሰብዎ ቢስማሙ እንኳን እርስዎ ያለመስማማት መብትዎ የተጠበቀ ነው፡፡ ማንኛውንም ስለ ጥናቱ ግልጽ ያልሆነሎትን ጥያቄ በማንኛውም ሰአት መጠየቅ እንዲሁም በመጠይቁ ወቅት መጠየቅ ካልፈለጉ ማስቆም ይችላሉ፡፡ይህንን ቅጽ በደንብ ከተረዱ፣ ከቤተሰብዎ ከተነጋገሩና ከተስማሙ ብቻ መስማማትዎትን በፊርማዎ ያረጋግጡልን፡፡

የተሳታፊው ፊርማ---------- ቀን----------

የመረጃው ሰብሳቢው ፊርማ----------

የስምምነት ማረጋገጫ ቅጽ (እድሜአቸው 18በታች ለሆኑ በቤተሰባቸው ወይም በአሳዳጊያቸው የሚሞላ)

ስለልጄ በዚህ ጥናት ላይ የመሳተፍ ፍቃድ ተጠይቄአለሁ፡፡ በመረጃ ቅጽ ላይ የተጻፈውን መረጃ በሙሉ አንብቤአለው ወይም ተነቦልኛል፣ተረድቻለሁም፡፡ ስለዚህም ለልጄ በጥናቱ ላይ መሳተፍ ፍቃዴን ሰጥቻለሁ፡፡ መስማማቴንም የሚያረጋግጥ ፊርማ ፈርማለሁ፡፡

የተሳታፊው ቤተሰብ ወይም አሳዳጊ ፊርማ----------ቀን----------

Annex IV: Information sheet and consent form (Afaan Oromo Version)

Unka odeeffannoo waa'ee qorannichaa hirmaattotaaf kennu

Fayyaa naaf kenni, Ani----------Barattuu barnoota gogaa tokkoof Dr.Muntahaa Jalaalu Hospitaala Qulqulluu Phaawuloositti waa'eedhukkuba Finniisaa fi dhimmoota kanaan walqabatan beekuf piroojektii qorannoo tokkoof daataa walitti qabaa jira. Qorannoo keenya irrattis akka hirmaatta naffeeramtaniittu. Unkaan kun hirmaachuf murteessuu keedura waa'ee qorannichaa odeeffannoo akka kennuuf kan qophaa'edha. Yeroo fudhattee yaadota armaan gadii sirriitti dhaggeeffachuuf qophaa'i. Yoo wanti tokko ifa hintaane gaaffii gaafachuu dandeessa. Meeyeroo muraasa fudhadhaatii qorannaa kana irratti hirmaachuu yoodandeessan nuuf ibsaa. Yoo walii galte unka walsimannaa armaan gadii mallatteessuu si barbaachisa.

Mata duree Qorannichaa: Dhukkuba finniisaa fidhimmoota kanaan walqabatan kutaa gogaa Hospitaala Qulqulluu Phaawuloos Addis Ababaa keessatti

Kaayyoon qorannichaa: Tatamsa'inadhukkuba finnii saafi dhimmoota kanaan walqabatan kutaa gogaa Hospitaala Qulqulluu Phaawuloos Addis Ababaatti madaaluuf

Mala qorannichaa: Qorannicha irratti hirmaachuf yoo walii galte unka hayyamaa mallatteessitee daqiiqaa 15f gaaffii fi deebii ni goota. Kana malees,namni daataa walitti qabu sun qaama keessan irratti finniisni jiraachuu fi dhiisuu isaan iilaala.

Faayidaan qorannichaa: Qorannoo kana irratti hirmaachuu keetin kaffaltii ykn faayidaa kallattiin biraa hin argattu, Garuu bu'a qabeessummaa fi galma ga'iinsa kaayyoo qorannichaaf barbaachisummaa guddaa qaba. Dhumarratti, bu'aan qorannoo kanarraa argame ogeeyyiin dhukkuba finniisaa karoora raga irratti hundaa'e karoorfachuuf, akkasumas ogeessota fayyaa tajaajila kana kennan tajaajila dabalataa qulqullina qabuuf akka qabeenya odeeffannootti akka oolutti fudhatama. Akkasumas,gara fuulduraatti hayyoota qorannoowalfakkaataa hojjetaniif qorannoo gadi fageenyaa gaggeessuuf odeeffannoo ta'a.

Miidhaan qorannoo kanarratti jiraachuu danda'u: Qorannoo kana irratti hirmaachun rakkoon ykn miidhaan akka hin uumamne hin sodaannu. Garuu yeroo keessan keessaa gara daqiiqaa 15fudhata. Qorannoo kana irratti hirmaachuu dhiisuun tajaajila argattu irrattid hiibbaa hin geessisu.

Iccitii qabaachuu: Odeeffannoon isin irraa walitti qabame kun iccitiidha. Teessoo ykn maqaa keessan qorannoo keessatti akka hin kaasne ibsina.

Mirga qorannicha irratti hirmaachuu dhiisuu ykn keessaabahuu: Qorannoon kun hirmaannaan guutummaatti fedhii ofiitin kan raawwatamuudha. Kanaafuu, hirmaachuu dhiisuf mirga guutuu qabda, qorannoo kana irratti hirmaachuu erga jalqabdee booda gaaffii kamiiyyuu deebisuu dhiisuu ykn yeroo barbaaddetti dhaabuu dhiisuu filachuu dandeessa.

Odeeffannoo dabalataaf: Qorannoo kana irratti odeeffannoo dabalataa yoo barbaaddan abbaan qorannichaa Dr.Muntahaa Jalaalu. Lakkoofsa bilbilaa +25193809380 ykn iimeelii muntesemer100@gmail.com irratti nu qunnamuu dandeessu.

Kanaaf odeeffannoo kennamee fi qorannoo kana irratti akka hirmaattan kabajaan isin gaafadha.

Unka hayyama kennuu (hirmaattoota umuriin isaanii waggaa 10 hanga 18 ta'aniif).

Akkam jirtu, An----------Barataa barnoota gogaa tokkoof Dr. Muntaha Jalaaluu Hospitaala Qulqulluu Phaawuloositti Hamma fincaanii fi dhimmoota kanaan walqabatan beekuuf Pirojektii qorannoo tokkoof daataa walitti qabaa jira. Waa'ee fincaanii caalaatti baruuf qorannoo kana irratti akka hirmaattan kan isin gaafataman yoo ta'u qorannoo kana irratti hirmaachuuf yoo walii galtan gaaffiiwwan murtaa'an isin gaafatamu. Kana irratti maatii keessan waliin mari'attanii murtoo ni gootu. Maatii keessanis hirmaachuuf hayyama ni gaafanna. Garuu maatiin kee yoo walii galanillee, walii galuu dhiisuuf mirga qabda. Waa'ee qorannichaa gaaffii siif ifa hin taane kamiyyuu yeroo barbaaddetti gaafachuu dandeessa, yeroo qorannootti gaafachuu yoo hin barbaanne dhaabuu dandeessa. Unka kana mallatteessuu kan dandeessan yoo sirriitti hubatte, maatii kee waliin haasoftee fi walii galte qofa.

Guyyaa:_____Mallattoo_____

Maqaa nama gaaffii fi deebii godhee_____Mallattoo_____

Unka hayyamaa warra/guddistoota hirmaattoota umuriin isaanii waggaa 0-18 ta'aniif.

Intalli/ilmi koo qorannoo kana irratti akka hirmaatuuf hayyama akkan kennu gaafatameen jira. Odeeffannoo dubbiseera, ykn naaf dubbifameera. Waa'ee qorannoo kanaa gaaffii gaafachuuf carraa argadheera, gaaffiin gaafadhe kamiifiyyuu deebii quubsaa argadheera. Mucaan koo qorannoo kana irratti akka hirmaatu fedhii kootiin hayyama nan kenna.

MaqaaWarraa/Guddistuu_____MallattooWarraa/Guddistuu_____

Guyyaa_____.

Annexes V: Questionnaires

Questionnaire to assess the prevalence and factors associated with Amblyopia among patients attending pediatric ophtalmology clinic at SPHMMC, Addis Ababa, Ethiopia, from September 2024 to August 2025.

Questionnaire Code _____

Date of data collection----------

Name of data collector---------- signature----------

Part I: Socio-demographic Characteristics

1. Age :_____
2. Sex
   - Male
   - Female
3. Place of birth
   - Urban
   - Rural
4. Residence
   - Urban
   - Rural
5. Maternal educational level
   - No formal education
   - Primary
   - Secondary
   - College and above
6. Paternal educational level
   - No formal education
   - Primary
   - Secondary
   - College and above
7. Average family income (per month; in Birr): _____

Part II: Behavioral, Genetic and ambyopia related Factors

8. Presenting Symptom

- Decreased vision
- Asthenopia
- Eye deviation
- Nystagmus
- Opacity un the eye
- Drooping of upper lid
- Came for screening
- Other

9. Age of symptom onset_____

10. Age of presentation at the hospital_____

11. Any previous modality of treatment for amblyopia

- Yes, Patching___
- Yes, Optical___
- Yes, Pharmacologic___
- No___

12. Family history of amblyopia

- Yes_____,Specify
- No_____

13. Birth weight _____grams

14. Gestational age_____in weeks

15. Maternal smoking during pregnancy

- Yes_____
- No_____

16. Family history of strabismus

- Yes_____,Specify
- No_____

17. Family history of refractive error

- Yes_____,Specify

- No_____

18. Maternal age

- < 35 years_____
- >35 years_____

19. History of surgery for strabismus

- Yes_____
- No_____

20. History of surgery for cataract

- Yes_____
- No_____

21. History of surgery for ptosis

- Yes_____
- No_____

Part III: Clinical Measurements

SN	Parameters	OD	OS	Remark
1.	UVA			
2.	Cycloplegic refraction			
3.	BCVA			
4.	CSM with correction			
5.	PCT/Krimisky with out correction			
6.	PCT/Krimisky with correction			

IV. Ocular factors, physical examination

17. Refractive errors

- Yes, right eye hyperopia___
- Yes, right eye myopia____
- yes, right eye astigmatism___
- Yes, left eye hyperopia____
- Yes, left eye myopia____
- yes, left eye astigmatism____
- No, ____

18. Clinically significant refractive error

- yes, right eye___
- Yes, left eye____
- No___

19. Anisometropia

- Yes, right eye____
- Yes, left eye
- No,____

20. Strabismus(with Cover/uncover test)

- Yes, right eye,____
- Yes, left eye
- No,_____

18. Media opacity

- Yes, right eye____
- Yes, left eye
- No_____

19. Posterior segment Patology

- Yes, right eye
- Yes, left eye____
- No_____

20. Amblyopia

- Yes, right eye____

- Yes, left eye
- No_____

Part IV: Diagnosis

SN	Diagnosis	OD(yes/no)	OS(yes/no)	Remark
1	Anisometropic amblyopia			
2	Meridional (Astigmatism) Amblyopia			
3	Strabismic Amblyopia			
4	Deprivational Amblyopia			
5	Isometropic Amblyopia			
6	Mixed Amblyopia			