

## **Effective Detection of Amblyopia Risk Factor Using Smart Phone Eye Testing Application**

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### **Abstract:**

Amblyopia also called as lazy eye. In this disease there is weak communication between human eyes with human brain. Due to this reason one of the eye is not working properly compare to other eye. Amblyopia starts in early childhood, and most of the children are loss his vision. In the world 3 to 4 child's are affected of amblyopia risk factors out of 100 children. If we give the early treatment on affected eye may be prevents long-term vision problems. This problem is focus in mind and author is doing study to accurately identify children at risk for amblyopia by using existing application from smart phone platforms. This study is not replace the advice of doctors on any condition.

**Keywords:** Amblyopia Risk Factor, Visual Acuity Test,

### **Introduction:**

Amblyopic or lazy eye is the leading cause of visual acuity for children in India. This is also a leading cause of childhood vision in through out the world. Amblyopia affects about 1%–4% children in the India. Affected amblyopia children can loss his vision permanently, but it can be treated early may prevent the loss of visual acuity. Some have shown that photo screening in children age between 3 to of 15 years can be a reliable method to detect amblyogenic risk factors. Various medical organizations recommend vision screening, but actual screening rates remain low as a result of perceived and real barriers, including parental perceptions that the procedure is too time-consuming or that children are uncooperative [1].

Some times photo screening test is used for to identify the risk factors of amblyopia. The American Academy of Pediatrics (AAP) and the United States Preventative Services Task Force (USPSTF) recommend photo screening test for amblyopia for the children age between 3 of 15 years.

### **2. Participants**

Project Investigator are visited to Neighbor and school children personally his home. Investigator are taken children history and consent form his parents or care taker for test his amblyopia.

Investigator are taken test of 100 students by using mobile App. Apart from 100 students 04 students are detected by amblyopia. I consulted and visited to the 100 students of age group of 3-15 years in Nanded as well nearby Nanded through students, friends, relatives and people in Nanded and near villages.

This is our Project Team



Naresh Age 9 years

Chaitrali Age 6



ea

rs

Viashnavi Age 8 years Pandurang Age 12 years

### **2.1. Inclusion criteria:**

Students in the age group 3 to 15 years.

## 2.2. Exclusion criteria:

Students aged less than 3 years and more than 15 years because students age below the 3 years having communication problem and not able to do the eye exercise. Students above the aged 15 years has eye macules are matured and not any effect of eye exercise for improvement of amblyopia.

This study was conducted at child home under the presence of child's parent and project investigator. Children aged between 3 to 15 years old are selected for this study. Project investigator is taken written or oral consent of every child's parent or legal guardian. The study I have done Eye vision test applications on smart phone platform [2].

Investigators have follow the Exclusion criteria based on Child's history. If the child has suffer with eye disease or eye surgery. This affects eye condition that may be results.

All children who met the enrolment criteria were screened using the Eye Vision Testing app on the iPhone. The eye testing application provides a template to optimize image of eye alignment and focal distance. The technician or doctors are confirm the child are looking directly on the camera before taking the image.

## 3. Methods

This study is started in 2021 in Nanded. The Principle investigator visited to schools and neighbors home for identifying the amblyopia affected child. In our study 100 participants are involved. Investigator collected the child's history from his parents or care taker. Each child has go through the vision screening test using Eye Vision Test app by using mobile. Vision screening data were collected my self from the child Nanded and near by Nanded Vilage. Apart from 100 child investigator identify the 04 child's has Amblyopia disease. The diagnosis was reviewed by two different Eye Vision Testing App.. The parents provided additional information on their child's eye history through written questionnaires and telephone interviews [3].

The study was conducted in accordance with the protocol, Good Clinical Practice Standards, and applicable regulatory requirements, particularly as they pertain t

children. All About Vision does not provide medical advice, diagnosis or treatment. Contact an eye doctor if you need medical attention.

## 4. Detection Sign of Lazy eye

1. The child cannot form a proper image with lazy eye or cannot see the bright sun, so may cover it to see properly. This is the first notable sign of a lazy eye.

2. Head tilt: The head may be tilted to one side while watching TV or trying to play catches so that the healthy eye can have better view of the TV or successful catch.

3. Difficulty in reading. [2,7]

The parent and close associates must pay attention to the child and observe for signs that indicate difficulty seeing or concentrating

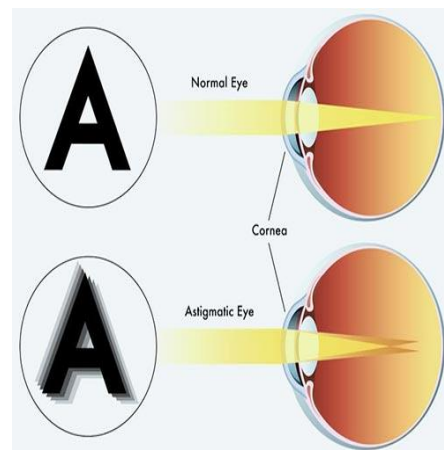


Figure 2. Visual Acuity of amblyopia.

## 5. Application stools for Amblyopia Identification

Project investigator identified the some tools for visual acuity, color blindness and eye exercise application. This application to determine the smallest letters you can read on chart. This application also used to determine if you have difficulty distinguishing certain colour. This application used for left eye and right eye visual acuity measurement [9,10]

Figure 1. Visual Acuity test result

**6. Adopted Procedure for Detection of Amblyopia (Visual Acuity) using Mobile App:**

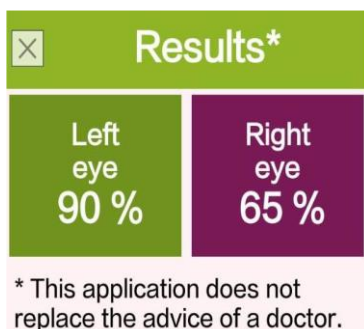
Visual acuity is a measure of how well you see or the sharpness and clarity of your vision. Visual Acuity is used to determine the smallest letters you can read on the chart. Visual acuity is also determine if you have difficulty distinguishing certain colors.

Instructions:

1. Take permission or consent from Childs parent.
2. Confirm Childs has no eye disease.
3. Place your phone approximately 30cm / 12 inches from your eye.
4. Cover your left eye with your left hand or patch the eye
5. Read the numbers on screen.
6. Numbers font size is decreases.
7. When you can no longer read more than half the numbers press stop button.
8. The smallest numbers you are able to read will be recorded as your acuity.
9. Start the test again with your right eye.

A person with lazy eye develops poor or blurred images in the affected eye. A lazy eye develops when the images in one eye is blurred and other eye is clear[4,5]

The first test, Visual Acuity test, which is conducted to see, whether the person has some eye defect, the result is shown is figure 1. The children were familiar with the iPad and regarded the experience as a game, approaching it with enthusiasm and remembering a pleasant experience. Normally children have amblyopia are identified by balanced brightness sense of eye. Brightness may be the most sensitive and absolute method to detect or identify the amblyopia risk in children.



**Results:**

Normal Visual Acuity Range	100 -75 %
Abnormal Visual Acuity Range	76- 60 %
Participants	100
Identified Participants of Amblyopia Risk Factor condition	04

As part of a normal vision screening, your child’s doctor will look for signs of amblyopia. All kids ages 3 to 15 need to have their vision checked at least once in a year.

**7. Referral Strategy**

In case of screening test, if child is found to be positive then child is referred for further assessment by doctor. The Vision test result is deemed positive if one or more items are abnormal. In case of doubt about the results—for instance, an uncooperative child—the test should be repeated within weeks[6].

The study is done by additional questionnaires to all parents about their children’s eye history. This study also including questions about vision screening and visits to the doctor. These questionnaires provided additional information on the follow-up of any positive screening results[8].

**8. Future Scope.**

Investigators are planning to this study on large scale of participants. He will also plan to visit various schools for to give information about amblyopia and its risk factors. So child’s are prevent from amblyopia and save his eye vision.

**9. Conclusion:**

Amblyopia vision test using smart phone are be a cost-effective. This is the alternative solution for parents to diagnosis the amblyopia. Using smartphone app I have tested the 100 children within the age range between 3 years to 15 years and I found 04 child’s are in amblyopia risk factors condition. All these 04 Childs are referred to the doctors for diagnosis and treatment to improve the eye vision. This

study is not replace the doctors on any condition. Child must be visit to the doctors for the further decision.

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