

Original Research Article

Cause of amblyopia in adult patients: a cross-sectional study

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ABSTRACT

Background: Amblyopia has been defined as a decrease of visual acuity for which no causes can be detected by the physical examination of the eye, caused by vision deprivation or abnormal binocular interaction. This study aims to determine the cause of amblyopia in adult patients at HAHC hospital South Delhi.

Methods: This is a cross-sectional study conducted over a period from January 2018 till March 2018 among the patients in HAHC hospital. A comprehensive eye examination was used to analyse the visual condition.

Results: Amblyopia was diagnosed in 42 participants, with age-and gender-adjusted prevalence of 3.2%. Of these, 1.9% were unilateral cases, and 1.3% were bilateral cases. A major cause of amblyopia in this population was a refractive error, hence using spectacle correction and vision therapy for its initial management.

Conclusions: This study has provided causes of amblyopia in an adult population. Amblyopia is a frequent cause of lifelong unilateral visual impairment.

Keywords: Amblyopia, Refractive error, Strabismus

INTRODUCTION

Amblyopia is made up of ambly-from the Greek "amblys" meaning blunt, dull, faint, or dim and-opia from the Greek "ops" meaning eye, and amblyopic can result from any condition that prevents the focusing.¹ The misalignment of the two eyes can cause amblyopia-a condition called strabismus. With strabismus, the eyes can cross in (esotropia) or turn out (exotropia). Occasionally, amblyopia is caused by a clouding of the front part of the eye(lens), a condition called cataract.² A common cause of amblyopia is the inability of one eye to focus and the other one. Amblyopia can occur when one eye is more nearsighted, more farsighted, or has more

astigmatism.³ These phrases refer to the eye's ability to focus light on the retina. They are used interchangeably. Farsightedness, also known as hyperopia, is a condition in which the distance between the front and back of the eye is abnormally short. Farsighted eyes tend to focus well on distant objects but have a difficult time focusing on close objects. Nearsightedness, often known as myopia, is a condition in which the eye is abnormally long from the front to the rear. Nearsightedness is characterized by the ability of the eyes to focus on objects that are close to them. It is difficult for people who have astigmatism to focus on both far and close objects because of the irregular shape of their eyes. Unstable inputs from the two eyes induce amblyopia in children, usually due to

strabismus, anisometropia, or a mix of the two. Amblyopia is classified as strabismic, deprived, refractive, or a combination of the three. All forms of amblyopia result in reduced vision in the affected eye(s). The visual deficits in amblyopia are due to disrupted development of the visual brain areas. It can be treated by patching the stronger and with glasses to improve refractive problems. Amblyopia can be difficult to detect because there is no cosmetic indication. With the strabismus, for example, the eyes may be crossed, or one turned outward or inward. Amblyopia doesn't have any visual signs, but it does have some symptoms, which can include: Difficulty with depth perception, Eyestrain, Visual fatigue and headaches.

Visual acuity of the amblyopic eye is not always firmly established even after amblyopia therapy has been terminated because the patient's age is beyond what is generally considered to be the critical period. Scott and Dickey reported a short-term follow-up study of amblyopic patients after patching therapy were stopped. Seventeen percent of patients lost a line of visual acuity and lost two lines or more. In a study of patients 10 years after amblyopia therapy was stopped, Gregersen and Rindziunski reported that 14% of patients lost all of the previously improved visual acuity in the amblyopic eye 67% of patients lost at least one line of visual acuity in the amblyopic eye.^{9,10} Managing amblyopia, the goal is to improve visual acuity by using two primary strategies. The first is to present a clear retinal image to the amblyopic eye by eliminating causes of visual deprivation and correcting visually significant refractive errors. The second strategy is to wake the patient use the amblyopic eye. The recommended treatment should be based on the patient's age, visual acuity, compliance with previous treatment, and physical, social, and psychological status. Amblyopia is treated during childhood, and the earlier the age, the better the treatment result. Can both eyes have amblyopia? Yes. When there is an equal amount so higher refractive error, both eyes may have poor vision (bilateral amblyopia) even when wearing glasses. Constant wear of glasses is very important, and vision is checked frequently. Vision typically improves but may several years. Race analysis by the vision in pre-schoolers (VIP) study group of head start preschool children found that the prevalence of amblyopia (3.0% Asian to 5.4% non-Hispanic white) was similar among the 5 racial/ethnic groups studied. Hispanics were found to have the highest rates of astigmatism and anisometropia, whereas non-Hispanic whites had the highest rate of hyperopia.¹³ Information about the psychological and economic impact of amblyopia lacks in the current body of published literature. A Cochrane database review found few randomized controlled trials to analyze the impact of living with untreated amblyopia and the cost-benefit analysis of amblyopia screening and treatment programs.¹⁴ A New Zealand study found neither amblyopia nor amblyopia treatment impacted the motor development, self-esteem, or adult socioeconomic status in their cohort. Additionally, the visual deficits did not

translate into important "real life" adverse outcomes.¹⁵ Another study found adults with amblyopia had mild decreased disability on utility analysis.¹⁶ Further studies have been suggested to evaluate what it means to have amblyopia and how the severity affects the quality of life.¹⁷ Amblyopia is a common public health problem. Most of the patients denied this treatment because of long-lasting beliefs.

The prevalence of amblyopia worldwide is approximate 1-5%.^{11,12} The world health organization (WHO) estimates 19 million children less than 15 years of age are visually impaired; of those, 12 million are impaired due to uncorrected refractive errors and amblyopia.

Aim

This study aims to determine the amblyopia in adult patients.

METHODS

This is a cross-sectional study conducted from January 2018 till March 2018 among the patients in HAHC hospital.

History of the patient: General history: name, age, sex, address, complaint, recording visual acuity with and without spectacles of the patient for both near and distance, If patients are having spectacles measure the power of the lens by lensometer, recording the maximum visual acuity of the patient by pinhole, Then refraction, record maximum visual acuity after refraction, still lamp examination for any pathological disorder, etc., Advise patient for therapy according to patient age, and review patients after 3 months for follow-up, In follow-up, patients record BCVA whether it is improved or not and no. of patients examined were 42 in numbers.

After testing, the log sheet will be fill out with a description. All data that were collated are analyzed with SPSS at the end of the 90 days. The goal is to improve visual acuity by using two basic strategies. The first is to present a clear retinal image to the amblyopic eye by eliminating causes of visual deprivation and correcting visually significant refractive errors. The second strategy is to make the patient use the amblyopic eye. We have included both male and females' patients. Exclusion criteria included patient who are not willing to participate in the study, Inflammatory conditions of eyes, dry eye conditions etc. All participants are guaranteed anonymity and confidentiality of the information obtained. The approval took before the study from the patients participating in the study. Informed consent was taken by all the participants included in the study. Subjects were informed about the duration and procedures of the study. and the research was approved by the institutional review board and the ethics committee for at department of paramedical sciences, Jamia Hamdard New Delhi India.

RESULTS

A total of 42 patients were included in the study, 18 were males and 24 females, and the population using a visual acuity criterion of 20/30 or less. Means age was 24 years. with age- and gender-adjusted prevalence of 3.2%. Of these, 1.9% were unilateral cases, and 1.3% were bilateral cases. Underlying causes included. Out of 42 patient refractive errors in amblyopia was found to be myopia 10 patients (23.80%), hypermetropia 15 patients (35.71%), astigmatism 8 patient (19.04%) and other causes (cortical inhibition 2 (4.76%), strabismic 7 (16.66%). Out of 42 patients hand movement (H. M.+) was seen in 02 patients, finger counting (FC at 1 m) in 02 patients, finger counting (FC at 2 m) in 03 patients, finger counting (FC at 3 m) in 01 patient, 5/60 in 08 patients, 6/60 in 06 patients, 6/36 in 06 patients, 6/24 in 03 patients, 6/18 in 08 patients, 6/12 in 03 patients before the start of therapy. Refractive error was found to be myopia 10 patients (23.80%) followed by hypermetropia 15 patients (35.71%) and astigmatism 8 patients (19.04%). To ensure adaptation, the patients received a comprehensive eye examination and wore their best correction for at least four weeks prior to baseline testing. They were instructed to patch their non-amblyopic eye for 2 hours per day. While patching, they were to perform near training exercises on the amblyopia iNET program for 30 min and do any near work for the remaining 1.5 hours. The patients had a baseline amblyopia evaluation and came in for 12 weekly study visits, at which time their visual acuity was measured with the E-ETDRS protocol. At 12 weeks, the treatment was tapered off over one month, and the patients came in for a final amblyopia evaluation at 24 weeks. A major cause of amblyopia in this population was a refractive error, hence spectacle correction for its initial management. Repeated assessment after an appropriate period of refractive adaptation would elucidate the proportion of amblyopia needing additional treatment modalities. Vision screening for early detection of amblyopia in childhood with accessible and effective management of amblyopia including refractive correction and occlusion therapy.

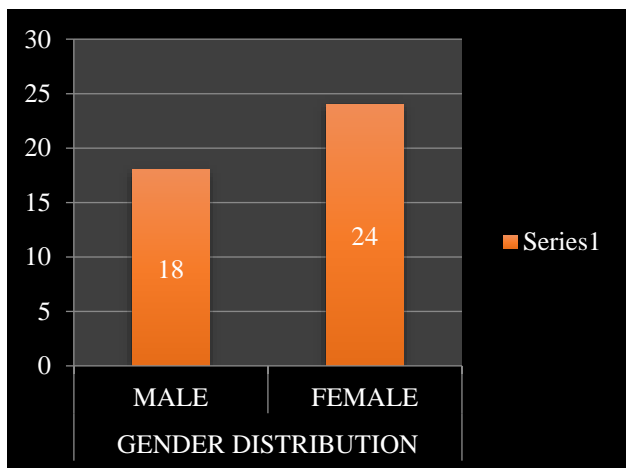


Figure 1: Gender distribution.

Table 1: Type and causes of refractive errors and other causes of amblyopia patients.

Types and causes		N (%)
Refractive error	Myopia	10 (23.80)
	Hypermetropia	15 (35.71)
	Astigmatism	8 (19.04)
Other	Cortical inhibition	2 (4.76)
	Strabismic	7 (16.66)

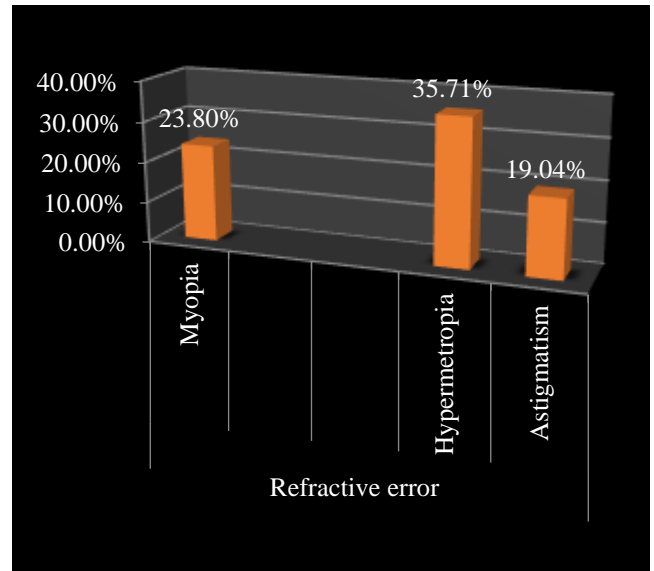


Figure 2: Percentage and causes of different types of refractive error in amblyopia patients.

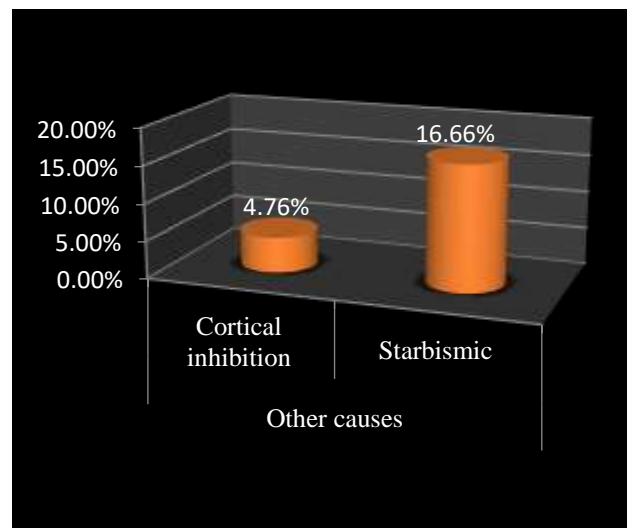


Figure 3: Percentage of other causes of amblyopia patients.

DISCUSSION

All the patients in our study. Those who completed the therapy had visual acuity better than the prescribed criteria for low vision, as stipulated by the WHO, compared to their pre-therapy visual acuity, which fell in

the purview of low vision.^{1,2} Patients with better visual acuity at the time of recruitment generally had better final visual acuity. Patients in which the therapy failed to produce the desired results had poor treatment compliance. This highlighted the importance of patching in the reversal of amblyopia in our patients. Monitoring compliance is a major concern when managing amblyopia in adults. If we excluded these patients from our study, the rate would be higher. The right eye was more affected by amblyopia as compared to the left. For many years, patching the non-amblyopic eye has been considered a standard gold method in amblyopia treatment and (Translucent) acupuncture, liquid crystal display eyeglasses are also other treatments of amblyopia.⁷ The purpose of the follow-up evaluation is to monitor the response to therapy and adjust the treatment plan as necessary. Determining the visual acuity of the amblyopic eye is the primary goal of the follow-up evaluation, but it is also essential to include interval history, especially adherence to the treatment plan; side effects of the treatment; and visual acuity in the fellow eye.³ Visual acuity can be changed because of refractive error, poor test reliability, reverse amblyopia, and persistent cycloplegia in an atropine-treated eye. In general, a follow-up examination should be arranged 2 to 3 months after initiation of treatment. Still, timing will vary according to the intensity of the treatment and the age of the child. The visual acuity outcome is highly dependent on performance at the follow-up examination and treatment adherence. Although there are limitations to this study due to the small sample size and shorter follow-up time, the present study indeed suggests a role of minimal occlusion therapy of 2-4 hours with stress on the near visual tasks in all anisometric amblyopic patients irrespective of age. It further shows that it is possible to treat amblyopia even after the critical period, although it requires more effort on the patient and the caregiver. Frequent follow-ups should be done to monitor progress. Successful, cost-effective amblyopia treatment provides rehabilitation, improves the patient's quality of life and self-confidence, and decreases the government's economic load on the government.^{8,6} To provide vision therapy to children identified to have refractive anomalies and assess vision therapy's impact on quality of life and reading performance after vision therapy.¹⁸ Despite its limitations (small sample size and short follow-up time), this study supports the use of 2-4-hour minimal occlusion therapy with emphasis on near visual task in all anisometric amblyopic patients regardless of age. It also reveals that amblyopia can be treated after the critical period, however it takes more work from the patient and caregiver. Follow-ups should be made often. Successful cost-effective amblyopia treatment enhances the patient's quality of life and self-confidence while reducing the government's financial burden.¹⁹

CONCLUSION

With mounting evidence of adult brain plasticity, perceptual learning, effect on visual performance by

vision training exercises, and significant results (as seen in our study-52.4% had BCVA of 6/6), It is essential that all amblyopic patients should be treated with minimal 2-4 hours of occlusion or patching of the better eye. This was a small study group. A long-term follow-up and a large-scale study are required to explore the effects of occlusion therapy in adult amblyopes fully.

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