Research Article

Low visual aids, the boon for improving visual functions of the visually handicap students of SarwaShikshaAbhiyan (education for all) of Nagpur district

Rahul Dagwar[1*], Nilesh Gaddewar[2], Ashok Madan[3]

[1]Assistant Professor, [2]Associate Professor, [3]Professor and Head, Department of Ophthalmology, Government Medical College, Nagapur, Maharashtra, INDIA.
Email:drrahuldagwar@yahoo.co.in

Abstract

Context: Many students of various government schools, having eye problems are referred to tertiary eye care hospital underSarwaShikshaAbhiyan (Education for all).**Aim:** To study the causes of blindness and functional vision improvement in visually impaired students (BCVA<6/60) by providing optical low vision aids (LVAs).**Setting and design:** Students of various government schools of Nagpur district are referred to government medical college, Nagpur for various eye problems under SarwaShikshaAbhiyan (education for all). Prospective series was conducted among the students who are advised visual handicap certificate (BCVA<6/60) after complete evaluation. **Materials and Methods:** Ocular evaluation of these students was done using World Health Organization's eye examination protocol by slit lamp examination, ophthalmoscopy, retinoscopy and visual acuity estimation with the log MAR chart at a distance of 4 m and reduced Snellen's acuity charts. LVAs were prescribed.**Results:** Study includes two hundred and thirty students who were advised handicap certificate (BCVA <6/60). ; Their mean age was 12.6 years (S.D. 3.3 years, range 5-20 years) and 123 (53.5%) were males. Two hundred and seven (90%) were visually handicap since birth. The students were handicap due to microphthalmos, anophthalmos and coloboma 121 (52.60%), diseases of cornea 30 (13%), lens 39 (16.9%), uvea 5%, retina 21 (9.13%) including retinopathy of prematurity (ROP) and optic nerve lesions 6%. LVA for distance was prescribed to 30 students (13%) who improved >1 line and for near was prescribed to 72 students (31.3%) of whom 68 attained N6-N12 acuity. **Conclusion:** LVA prescription improved visual acuity of visually handicap students and allowed them to learn and read print.

Keywords: Causes of blindness, functional vision, low vision, SarwaShikshaAbhiyan (education for all), severe visual impairment.

[*]**Address for Correspondence:**
Dr.Rahul Dagwar, Assistant Professor, 2Associate Professor, 3Professor and Head, Department of Ophthalmology, Government Medical College, Nagapur, Maharashtra, INDIA.
Email:drrahuldagwar@yahoo.co.in

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INTRODUCTION

Students whose severe visual impairment and blindness cannot be treated medically or surgically are given visually handicap certificates and some are enrolled in special schools for the blind where most instructions are in Braille. Numerous studies from India have shown that such visually handicap students have some functional vision which can be put to good use.[5,11] These students could be taught to read print in addition to Braille, as this would enormously improve their career options and economic prospects. Such students could also attend integrated schools which would help not just their academic but also social and emotional development.[6,12]

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The aim of this study was to find the causes of blindness in such students andto know how many students improved by use of low vision aids (LVDs).[1]

MATERIALS AND METHODS

Under SarwaShikshaAbhiyan (education for all), students of various govt. schools of Nagpur district having eye problems were referred to govt. medical college, Nagpur for further evaluation and treatment. Students whose severe visual impairment and blindness (BCVA<6/60) cannot be treated medically or surgically areenrolled for visually handicap certificate and only such students are included in ourprospective study conducted between June 2013 to march 2014. The study was approved by the institute's ethical committee. The students were examined and findings were recorded as per 'WHO/PEL Eye Examination Record For Children With Blindness And Low Vision'.'[7]'. Eye examination was done within the leisure of each standard. History of patients was obtained from the parents and school teachers. Each student's name, home town or village, age, gender, ethnic group and age of onset were recorded.Students were examined if they were with or without spectacles or any LVDs (LVA). Vision for distance was estimated using the logMAR chart keeping the distance of 4 m from the patient. Reduced Snellen's chart was used to assess near vision. Functional vision was determined by the four grades as made in the WHO protocol — ability to walk around independently, ability to recognize faces, ability to see prints (2 lines of N10 letter size) and the students who could use the residual vision.[7]Slit lamp examination and fundoscopy was conducted and along with this refractive error, amblyopia and/or idiopathic nystagmus were noted. The major site of abnormality leading to visual loss for the child was also recorded.Objective retinoscopy was done using the Heine Beta 200^{R} Retinoscope. Subjective refraction was done using the logMAR chart under sufficient light and with the help of trial frame and set. Proper illumination of the examination room and the chart were strictly maintained during the LVA assessment.The following steps were maintained in prescribing LVA for distance:

1. Localization
2. Focusing
3. Spotting
4. Tracing
5. Tracking
6. Scanning

Prescribing low magnification LVAs also provided to acquire comparatively larger field of view and easy in tracing and tracking techniques.Assessment of LVAs for a distance was done by the following formula:

Magnification Required = Required visual acuity/Presentvisual acuity

An approximate requirement of LVA for near could be estimated whose unaided distance or near visual acuity was measured. Assessment of LVA for near was done by the following formula:

Magnification Required = Present visual acuity/Requiredvisual acuity

For the evaluation of near vision reduced Snellen's charts were used, under adequate room illumination. Illuminated stand magnifier of 5x and 7.5x, non-illuminated stand magnifier of 2.5x and 7.5x, bar magnifier, fresnel prism, hand held magnifier of 20 diopter (D), 35D and spot magnifiers of 24D, 32D, and 40x were used for trial. For the students who failed to read at least N26 with the required or best benefited LVA, an additional luminance of 50 lumens was provided. This procedure was not done in exceptional cases like albinism.The trial for LVA was done in right and left eye separately. And use of LVA was noted for the eye which showed to attain the maximum visual acuity in the particular candidate. Accordingly, a copy of medical record of students was given to respective schools, so that the authority can take necessary steps to provide LVAs. The teachers of the school were also councelled whether the student should continue in the present school, or should be shifted to integrated educational centers. All the data recorded were analyzed statistically using Microsoft Excel and SPSS software.

RESULTS

A total of 230 students were examined; their mean age was 12.6 years with a standard deviation of 3.3 years, range 5-20 years; of them 123 (53.5%) were males. Two hundred and eight (90%) were visually disabled since birth. The presenting visual acuity (V/A) of both eyes was noted. Functional vision was recorded by assessing the day-to-day life activities. Of the students examined, 96 (41.7%) could see enough to walk around independently, 58 (25.2%) could recognize faces and 41 (17.8%) were able to see print.The major causes of blindness and severe visual impairment (SVI) are depicted in. The no of students who were blind due to microphthalmos and anophthalmos, coloboma was 71 (30.9%), cornea 30 (13%), lens 39 (16.9%), uveitis 5%, retina 21 (9.3%) including retinopathy of prematurity (ROP) and optic nerve lesions 6%. The corneal causes were phthisis 08 (3.5%), anterior staphyloma 12 (5.3%), corneal opacity in 23 (10%), corneal dystrophy 08 (3.7%), keratoconus 3 (1.5%), scarring 3 (1.3%) and microcornea 3 (1.4%). Buphthalmos was observed in 2 (0.7%) students, while 2 students had their eyes removed. Retinal dystrophies were found in 08 (3.7%), albinism in 05 (2.2%), retinitis

pigmentosa in 04 (1.5%), retinopathy of prematurity in 03 (1.3%). All children with lens opacities were undergone surgical intervention and managed comprehensively.As all the students were the first time user of LVAs, 2.25x and 3.5x telescopes proved to be a good option. LVA for a distance was prescribed for 30 (13.05%) students.LVA for near was prescribed to 72 (31.4%) students. The 5x illuminated stand magnifier proved to be user friendly to students. Shows the various devices prescribed for near vision. With the LVA most of the students acquired near vision N10-N12, 5 out of 230 students were able to see N6 letter size.The mean visual acuity of the 230 students in the right eye was finger counting at 2 m (logMAR value l.47) which improved to 6/60 (logMAR value of 1.0). And similarly in the left eye the unaided visual acuity which was finger counting a 2 m which had improved to a logMAR value of 0.9. In all, 87/230 (37.82%) students were prescribed LVA and their vision improved. 57 students were prescribed LVAs only for near, 30 accepted and improved with LVA for both near and distance whereas 5 students prescribed LVA only for distance.

DISCUSSION

A large number of students who are advised blind certificate (BCVA<6/60) were congenitally blind due to abnormality of the globe. So, most of the individuals had no perception of light. But these visually disabled students could use their residual vision for functional purposes. Some of the candidates could not see to walk around and see face and prints (minimum N24, maximum N6). The purpose of the prescribing LVAs was to improve their residual vision for functional use.In causes of blindness and visual impairment microphthalmos and anophthalmos being the leading cause, corneal causes and lenticular causes (cataract, aphakia) are relatively more common. The retinal dystrophies are much less than the series from Karnataka.[14]'All the students (except PL negative) were given a trial of LVAs. In this 33 (14.4%) had improved at least one step of V/A assessment. visually disabled preferred self-illuminated stand magnifiers rather than non-illumination pattern of the same magnification. And in distance, LVA 2.25x was preferred over a 3.5x magnification telescope.In similar studies from London, UK, 35.7% students improved with LVA.'[8]' In another study it was found the child's need for near LVAs could be predicted from their age, unmagnified reading performance, and visual field characteristics.'[9,10]In a cross-sectional study done in 13 special education schools in Delhi, high additional plus lenses were used as spectacle magnifiers for near and resulted in 20.3% children improving by at least one WHO category of blindness.[1,21] The children who benefitted most by LVA were those with aphakia[17], followed by coloboma[5], refractive error[5] and microphthalmos[4]. The authors concluded that visually impaired children with aphakia and ocular congenital anomalies benefit from refraction and low vision services.[21]A comparative study done by Silver and Gould E between 60 students of integrated school and 34 children attending partially sighted school stated that the integrated children tended to be more intelligent.[10] More students could avoid special schools if given appropriate services at an early age and assessment by examiners and team.In a study done on 345 students of 12 Schools for blind in Nepal it was found 64.2% had avoidable blindness. Fifty-seven (28.2%) students could read smaller than 2 M print size after low vision assessment for near and 33 (15.8%) students benefited with telescopic trial for distance low vision, similar to results of this study.[1,11]

A study conducted by Cardiff University on 168 people revealed that after a low vision assessment and provision of a suitable LVD 88% of patients were able to read N8 or smaller text.[1,11]Proper evaluation of students admitted in the blind school should be performed at least once in a year to tackle treatable and avoidable blindness. A joint effort on part of optometrist and ophthalmologist and schools and regular low vision assessment could result in many students being enabled to read and learn print and getting into integrated education and having more choices of vocation and recreation in the future and develop their potential to its truest extent.

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