Pediatric low vision care services: a new era
Sarika Gopalakrishnan and Sumita Agarkar

Introduction
The major causes of blindness in children vary widely from region to region, being largely determined by socioeconomic development, and the availability of primary health care and low vision care services.\(^1\) The prevalence of blindness in children ranges from ∼0.3/1000 children in affluent regions to 1.5/1000 in the poorest communities.\(^2\) Reliable population-based data on the causes of blindness in children are difficult to obtain in developing countries.\(^2\) There is an increasing awareness about the needs of students with low vision, particularly in developing countries where programs of integrated education are being developed. However, the appropriate low vision services are usually mandatory in order to improve their residual vision.

Definition of low vision
A child with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of <6/18 to light perception, or a visual field of <10° from the point of fixation in the better eye, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential (WHO, 1992).

Impact of low vision
Functionally, low vision is described as irreversible visual loss and a reduced ability to perform many daily activities, such as recognizing people in the street, reading blackboards, writing at the same speed as peers, and playing with friends.

Causes of low vision
The major causes of visual impairment among children includes Stargardt’s disease, Myopic degeneration, Oculocutaneous Albinism, Retinitis Pigmentosa, Maculopathy, Optic Atrophy, Corneal opacities, Rod cone dystrophy and other heredomacular degenerations.\(^3\)

In the year 2010
The mean number of children seen in the Low Vision Care clinic per year was found to be 1500. The referral criteria included children with low vision and constricted field of vision.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Before 2010</th>
<th>After 2010</th>
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<tbody>
<tr>
<td>History</td>
<td>General history, family history and birth history</td>
<td>Classroom environment history, academic performance</td>
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<tr>
<td>Vision assessment</td>
<td>Regular method of vision assessment with usual logMAR chart</td>
<td>Functional vision assessment for pre-verbal children with Cardiff acuity card, rudimentary vision kit and LEA symbols</td>
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<tr>
<td>Management</td>
<td>Usually spectacles or optical magnifiers would be the choice</td>
<td>Additionally a wide range of non-optical devices and electronic assistive devices are available</td>
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<tr>
<td>Advice</td>
<td>Generalized case summary would be given</td>
<td>Specific letter to school management is being given based on the needs (e.g. seating arrangements, compensatory time during examinations, use of low vision devices, etc.)</td>
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<tr>
<td>Referral</td>
<td>Most of the times children will be referred to blind school</td>
<td>Children will be referred to integrated or inclusive mode of schooling</td>
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New initiatives
1. Awareness on referral criteria among eye care professional including Ophthalmologists was created.
2. The range of optical devices and non-optical devices were extended significantly, so that appropriate magnification was chosen for trial and final prescription.
3. Latest varieties of electronic assistive devices were introduced from different parts of the world.
4. Tools and devices used for daily living activities were included in the stock.
5. All the devices were purchased from all over the world and for lower cost.
6. Primary low vision care service was introduced in all the floors and branches of the tertiary eye care center, so that more number of patients got benefited.
7. Organizational membership was received from Bookshare for accessing DAISY books, which can be useful for patients with print disabilities.
8. Psychological counseling on self-motivation and need for special schooling are being provided to the parents whose children are visually impaired.

9. Braille training and Computer JAWS software demonstration are provided for children with low vision.

10. Smart Cane demonstration for orientation and mobility training.

**Transformation in the trend**

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<td>ONYX electronic assistive device</td>
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<td>Mouse model CCTV/ portable CCTV</td>
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<td>Reading tasks</td>
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<td>Writing tasks</td>
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<td>Watching TV</td>
<td>Approach magnification</td>
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<td>Computer</td>
<td>External screen magnifier</td>
<td>In-built modifications/ JAWS/MAGIC</td>
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<td>Tactile cues for keypad</td>
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<td>7.</td>
<td>Non-optical devices</td>
<td>Four lined notebooks</td>
<td>Typoscope/letter writer</td>
<td>Thick lined notebooks</td>
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<td>Writing in larger size</td>
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<td>Activities of daily</td>
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<td>Color identification</td>
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<td>10.</td>
<td>Recreation</td>
<td>Nil</td>
<td>Increased task illumination</td>
<td>Jumbo playing cards</td>
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**Mode of schooling**

1. **Mainstream**: School with normal children without any disability.

2. **Integrated school**: A school where both normally sighted and visually impaired students will be studying in the same class.
   (a) **Resource model**: The school is provided with the resource set up, where a teacher will be available all the day. During the free hours, the students with visual impairment go to the resource room for guidance.
   (b) **Itinerant model**: The Resource teacher (Special Educator) goes to different schools and visually impaired children’s place to teach them.

3. **Inclusive school**: Mild to moderate form of all types of differently abled children will be included along with the normal children.

4. **Special school**: A school for visually impaired/deaf-mutism/mentally retarded/learning disability/any specific disability.

**Rights and consideration**

**Scholarship**

1. The Union Ministry of Welfare since 1955 has been operating through the state Governments...
and Union territories a scheme of scholarships awarded to challenged person for pursuing education in special schools being run by non-government organizations.

2. The Rate of scholarships is Rs.1000/- per annum for cases hailing from the lower socio-economic status and is renewable from year to year.

3. In case of severely challenged persons who require special arrangements for transportation, an additional monthly allowance of Rs.50/- is sanctioned.

The following allowances and facilities are provided under this scheme

1. Books and Stationary allowance of Rs.400/- per annum.
2. Uniform allowance of Rs. 50/- per annum.
3. Transport allowance of Rs.50/- per month (if a challenged child admitted under the scheme resides in a hostel of the school within the school premises, no transportation charges would be admissible).
4. Reader allowance of Rs.50/- per month in case of blind children after class V.
5. Escort allowance for severely handicapped children with lower extremity disabilities at the rate of Rs.75/- per month.
6. Annual cost of equipment subject to a maximum of Rs.2000/- per student for a period of 5 years.
7. The tuition payable and actually paid by the Government servant is reimbursable subject to Rs.50/- per month per child in the case of multiple disabled children.

Railways

1. 75% concession in the basic fare in the first and second class is allowed to persons with multiple disabilities accompanied by an escort.
2. 50% concession in the first and second class monthly/quarterly season fares both for the individual with disability and his/her escort over suburban and non-suburban section of Indian railways is allowed.

Roadways

1. Most State Governments having state owned and operated transport undertakings or corporations allow subsidized/free bus travel in the city and rural routes, and an escort is charged fifty percent of the fare.

Conclusion

Majority of the students with low vision need low vision services in order to perform better. Accurate refraction is important in the students. Early diagnosis and intervention helps in preventing the vision loss which will lead the students to continue their academic activities without any interference. Many children need additional support from the Government in order to continue their education. The need for awareness on management and referral of children with Low vision has to be improved in this Millennium due to increasing number of children who discontinue their schooling due to Low vision. Awareness among eye care professionals and parents is mandatory for bringing up these children with Low vision.

References


Case 1:

General history: A 14-year-old female diagnosed with High Myopia and associated retinal finding of dry macula (Myopic Retinal Degeneration) was referred to the Low Vision Care Clinic as she had discontinued school 3 months back. She was accompanied by her parents. There was no family history of parental consanguinity. Her younger sister had myopia (around -3.00D and no visual impairment). There was no other relevant history.

Previous low vision care: nil

Present complaints:

Distance visual tasks: The patient had difficulty seeing the blackboard and recognizing the faces of people who were more than 3 m away. She watched television from a distance of 1 m.

Near visual tasks: The patient was able to manage at a close working distance of around 15 cm.

ADL/mobility: These tasks were independent.

Light sensitivity: There were no complaints regarding light sensitivity.

Additional history: Classroom environment

School: Private school (English medium), State Board of Education syllabus.
Medium of teaching: English.

Class strength: 30.

Academic performance of patient: Average (50–60%).

Reason for discontinuing school: Unable to see blackboard from front bench at a distance of 3 m.

Parents say teacher wrote letters of size about one finger length (∼2.5 inches or 6–7 cms).

Color of board: Black.

Letters: White chalk used, colored chalk: rare.

Class lighting: Sufficient (no glare and no complaints of dim/poor lighting, including cloudy days).

Internal lighting present in class: three fluorescent lights.

External lighting: three large windows.

Seating position: Third row, center.

(No flexibility in seating, not allowed to copy or reference friends notebook).

Visual requirements: Seeing blackboard.

Examination:

Previous glass prescription:
OD: −13.50 DS/ −2.00C × 50,
OS: −12.00 DS/ −1.25 DC × 45.

Distance visual acuity with glasses:
OD: 3/30**2, 6/60**2,
OS: 3/19, 6/38,
B/O: 3/19, 6/38.

Near visual acuity with glasses: OD/OS/B/O: N8 @ 15 cm.

Reading speed: 40 wpm.

Unaided near visual acuity: B/O: N5 @ 10 cm

Reading speed: 60 wpm.

Refraction:

Retinoscopy:
OD: −11.50DS/ −1.00 DC × 60,
OS: −11.25 DS/ −1.25 DC × 120.

Dynamic retinoscopy: (MEM)

Accommodative Lag: +1.00 DS to +1.25DS

Subjective refraction
OD: −11.50DS/ −1.00 DC × 60 [3/9.5, 6/19],
OS: −11.25 DS/ −1.25 DC × 120 [3/9.5, 6/19].

ADD: OU: Does not prefer ADD

Unaided near visual acuity: N5 with ease @ 10 cms

Low contrast visual acuity: 3/19 [6/38] @ Borderline impairment.

D15: Normal,

Amsler: No scotoma detected,

Confrontation: Normal peripheral fields.

LVD Trial for distance:

Required visual acuity: 6/6

Magnification required: 19/6 = 3 x

Trial 1: 3x Monocular Handheld Telescope: 6/6 with ease.

Telescope training was given—able to localize, hold fixation, scan, track and copy from text on sample blackboard.

Copies text at speed of 30–40 wpm.

LVD trial for near: Reads up to N8 with correction.

 Reads up to N4 unaided.

Trial 1: Add +1.00DS to +5.00DS tried in 1.00D steps. Patient does not report significant difference/improvement

Trial 2: With 4x Dome Magnifier: N4; Reads with ease @ 40 cms Reading speed: 80 wpm.

Final Rx:

1. New Rx for distance.
2. 3x Monocular handheld telescope for use with blackboard.
3. To use dome magnifier for prolonged reading tasks, to reduce eyestrain, reference atlas, maps, dictionaries or fine print.
4. To use reading stand for prolonged reading tasks to aid posture and maintain working distance.

Other advice: The condition and prognosis were clearly explained to the parents. The parents were reassured about closer working distance and the need to use a magnifier for comfortable reading at close working distance was explained. The child was advised to continue her schooling with the help of low vision care. They were also counseled about available options for computer modification and magnification.

Case 2:

General history: An 8-year-old-Female diagnosed with Congenital Stationary Night Blindness was accompanied by her parents to the low vision care clinic. Her difficulty with dimly lit environment was noticed by the parents at around 1 year of age. She was staying with her parents and two elder brothers. She was currently studying in Std II. Her parents did not have a consanguineous marriage but her mother’s age was around 34 when the child was born. Her father who was
working in an automobile assembly company was the source of family income.

Previous history: She had no history of using any low vision devices. External observation showed she had good fixation but difficulty in searching for a pen among various items placed on the table.

Present complaints:

Distance visual tasks: Difficulty with seeing the blackboard in the classroom (3 m), seeing objects at distance while sightseeing. She was able to manage all near acuity tasks at a closer working distance.

Mobility and ADL: She was able to move around independently but had difficulty in dim light and took long time to adjust to dimly lit surroundings. She had independent Activities of Daily Living within the limitations of her age.

Additional history: Classroom environment:

1. Seated at 3 m from blackboard.
2. Teacher uses white chalk. Colored chalk used occasionally.
3. Allowed to come close to the board.
4. No note-taking until class IV in the school.
5. Artificial room lighting—five fluorescent lights.
6. Class strength: 40 students.
8. Type of school: Private.

Patient requirement: Seeing blackboard.

Examination:

Near visual acuity: N10 @25 cm with the MN Read chart at 10 wpm good reading skills.

There was no difference between monocular and binocular visual acuities. There was no significant refractive error on objective refraction.

Dynamic retinoscopy: Accommodative lag: +1.00DS.

Cycloplegic refraction: No refractive error requiring correction detected.

Low contrast visual acuity with Bailey Lovie Low Contrast LogMAR chart was 3/15 [6/30] (Within normal limits).

Color vision: Able to match a few colors on the D15 panel but could not comprehend the entire test.

Confrontation: Mild peripheral field deficit beyond 50° visual field.

Trial of low vision devices

(1) 4× monocular handheld telescope: 6/6 (no specific preference for right or left eye)
Near ADD: OD/OS: +2.00DS: N4 @ 20 cm.
The child seemed to be able to read better and reading speed improved to 25 wpm for finer print (>N10 size).

Final Rx:

1. New Bifocal Rx with +2.00DS ADD.
2. The parents were advised to purchase over the counter binoculars of 3× or more magnification.
3. A letter was given to the school to provide a separate seating arrangement closer to the blackboard at <2 m when required. (Currently, students were not required to copy any notes from the blackboard.)

Advice:
The child was advised to be seated in a separate chair (in front of the front row) closer to board at ~2 m. Letter was given to school management recommending closer seating arrangement, increased lighting level and compensatory time for completing her examinations. The parents were advised to increase the illumination level at home especially during night time. The child needs to be instructed on caution regarding mobility tasks. Option of low vision devices were explained to parents which will be beneficial in the future. The patient was advised to come for an annual low vision care visit with her school books and class notes.
APPENDIX 1

CLASS ROOM ENVIRONMENT

Standard: Informant:
Mode of education: a) Special school b) Regular school c) Private tutor
School name/College name:
Class teacher/Principal name:
Address of the school/ college:

1. Class strength:
2. Seating position: Center/Corner
3. Approx distance from board:
4. Which bench/row:
5. Color of writing material on board:
6. Color of the board:
7. Number of windows in class:
8. Sitting beside window:
9. Amount of light in class: Dimly illuminated/Optimally illuminated/Glaring (too bright)

Academic performance:
Good peer-group interaction: Yes/No Good parent–teacher interaction: Yes / No
Is there any difficulty in copying from black board: Yes/No
If yes: managing by:
Copying from friends/Going close to the black board/Taking friends note-books to home/Teacher’s dictation.
Others:

Using extra hours for writing exams: Yes/No
Use of special assistance: Yes/No
If yes: Scribe/Braille/Talking books/Audio cassettes
Others:
Since how long:
Any difficulty with special assistance:
Is the teacher co-operative and ready to give individual attention: Yes/No/NA:
Will the school management be ready to make changes in the setup: Yes/No/NA
Letter to the class teacher required: Yes/No/NA
LETTER TO SCHOOL MANAGEMENT

LOW VISION CARE CLINIC

TO WHOMSOEVER IT MAY CONCERN

This is to state that Master/Miss.______________ who is studying ___STD in your school (Reference MRD No.: __________ ) was evaluated in the Low Vision Care Clinic. He was noted to have _________ Visual Impairment in both the eyes due to retinal problem.

This vision will not be sufficient to view the black board comfortably. He needs to be seated closer to the black board (i.e. 1 m distance) or in the front row (without rotation). Most of his learning will be through listening to the classes, so dictating as much as possible will help him in a large way.

Kindly, allow him to copy notes from his friend’s notebook in case he is not able to copy from the black board directly. In addition, he can be given compensatory time concession of minimum 30 min for all examinations (school level and for board exams).

Please extend your co-operation so that his ocular condition doesn’t interfere with his academic performance.

Thank you for your kind co-operation.

Yours sincerely,

(_________________)
Optometrist
Low Vision Care Clinic
Sankara Nethralaya
Chennai
Tamil Nadu
Phone: 044-42271519

How to cite this article Gopalakrishnan S, Agarkar S. Pediatric low vision care services: a new era, Sci J Med & Vis Res Foun 2015;XXXIII:141–147.