SQU Med J, February 2012, Vol. 12, Iss. 1, pp. 62-68, Epub. 7th Feb 12.
Submitted 19th Jun 11
Revision Req. 29th Oct 11, Revision recd. 13th Nov 11
Accepted 30th Nov 11

Magnitude and Causes of Low Vision Disability (Moderate and Severe Visual Impairment) among Students of Al-Noor Institute for the Blind in Al-Hassa, Saudi Arabia

A case series

Fahad Al-Wadani[1,2] *Rajiv Khandekar,[3] Muneera A. Al-Hussain,[2] Ahmed A. Alkhawaja,[2] Mohammed Sarfaraz Khan,[2] Ramzy A Alsulaiman[2]

حجم وأسباب الإعاقة البصرية المعتدلة والحادة بين طلاب معهد النور للمكفوفين في الأحساء بالمملكة العربية السعودية

مجموعة حالات

فهد الودعاني، راجيف خانديكار، منيرة الحسين، أحمد الخواجة، محمد خان، رمزي السليمان

الملخص: **الهدف:** تهدف هذه الدراسة لتقدير حجم وأسباب الإعاقة البصرية (ضعف البصر الشديد، وضعف البصر المعتدل) بين طلاب معهد النور للمكفوفين في الإحساء، المملكة العربية السعودية في عام 2006 م. **الطريقة:** تم فحص حدة الإبصار على 122 عينا لعيّنة بلغ عددها 61 طالبا (27 فتى و 34 فتاة)، حيث تراوحت الإعاقة البصرية المتوسطة بين <6/18 إلى 6/60، والإعاقة البصرية الشديدة من <6/60 إلى 3/60. قام أطباء العيون بفحص الغرفة الأمامية والخلفية للعين، وتم تحليل نتائج الفحوصات للوصول إلى التشخيص النهائي. تم تصنيف النتائج على ثلاث مجاميع: "يمكن الوقاية منها"، " يمكن علاجها"، و"غير قابلة للعلاج". كذلك تم استعراض الرعاية المتوفرة للإعاقة البصرية. **النتائج:** بلغت حدة الإبصار ≥ 6/18 في 12 عينا (9.8%) من عينة الدراسة، و<3/60 في 82 عينا (23%). وكان الضعف البصري شديدا إلى متوسطا في 82 عينا (67.2%). وجدت حالات الاضطرابات الشبكية الوراثية في 68 عينا (55.7%). ولو أن الأخطاء الإنكسارية وجدت في 112 عينا (91.8%)، إلا أنّ 9 طلاب عانوا من أخطاء إنكسارية معزولة. كان داء الزَرَق الخلقي مسئولا عن ضعف البصر في 16 عينا (13.1%)، بينما سبّب الساد الخلقي ضعف البصر في 9 عيون (7.4%). تم وصف مساعدات للإبصار لهؤلاء الطلاب. **الخلاصة:** أثبتت الدراسة الحالية أنّ مرض الشبكية هو السبب الرئيسي لضعف الإبصار الشديد والمتوسط. هناك حالات متعددة من طلاب معهد النور للمكفوفين قابلة للشفاء. إعادة تأهيل ضعاف البصر تكون مختلفة عن تلك التي تقدم للمكفوفين بشكل تام.

مفتاح الكلمات: عمى، ضعف البصر، أطفال، إعادة تأهيل، المملكة العربية السعودية.

ABSTRACT: *Objectives:* This study aimed to estimate the magnitude and causes of low vision disability (severe visual impairment [SVI] and moderate visual impairment [MVI]) among students at Al-Noor Institute for the Blind (NIB) in Al-Hassa, Saudi Arabia in 2006. *Methods:* An optometrist conducted refraction of 122 eyes of the 61 students (27 boys and 34 girls) with MVI (vision <6/18 to 6/60) and SVI (vision <6/60 to 3/60). Ophthalmologists examined the anterior and posterior segments, and analysed the outcomes of additional investigations to finalise the diagnosis. The results were categorised as 'preventable', 'treatable' and 'not amenable to treatment'. The low vision care was also reviewed. *Results:* In 12 (9.8%) eyes, visual acuity was ≥6/18 and in 28 (23%) eyes, it was <3/60. MVI and SVI were found in 82 eyes (67.2%). Hereditary retinal disorders were found in 68 (55.7%) eyes. Although refractive errors were found in 112 (91.8%) eyes, isolated refractive error was found in only 9 students. Congenital glaucoma and cataract were responsible for visual impairment in 16 (13.1%) and 9 (7.4%) eyes. These students were prescribed optical and non-optical low vision aids. *Conclusion:* Retinal disease was the main cause of SVI and MVI in our series. Some students at Al-Noor Institute for the Blind have curable low vision conditions. Rehabilitation of low vision disability should be different from that offered to the absolutely blind.

Keywords: Blindness; Low Vision; Children, Rehabilitation; Saudi Arabia.

[1]Ophthalmology Department, School of Medicine, King Faisal University, Al-Hassa, Saudi Arabia; [2]Ophthalmology Department, Al Jabr Eye & Ear Hospital, Ministry of Health, Al-Hassa, Saudi Arabia; [3]Eye & Ear Health Care, Ministry of Health, Muscat, Oman.
Corresponding author e-mail: rajiv.khandekar@gmail.com

Advances in knowledge

1. *A large number of students at in Al-Noor Institute for the Blind in Al-Hassa, Saudi Arabia, suffer from low vision disability and need rehabilitation which should be different from that offered to those with absolute blindness.*
2. *Posterior segment pathologies that could not be treated constituted 75% of children, with moderate and severe visual impairment. (MVI and SVI)*
3. *Refractive error as a single condition was noted in only nine (15%) children. Even after correction of refractive error, these children had low vision and hence rehabilitation was needed.*
4. *Comprehensive visual function assessment of children with SVI and MVI is essential for proper low vision care.*

Application to patient care

1. *A total of 75% of the children with MVI and SVI at Al-Noor Institute for the Blind in Al-Hassa, Saudi Arabia had posterior segment pathologies.*
2. *It is important to carry out comprehensive and periodic visual function assessment of students with MVI and SVI at schools for the blind.*
3. *Rehabilitation of children with low vision disability should differ from that for children with absolute blindness (no light perception).*

As the study of community-based prevalence of childhood blindness needs a large sample, researchers have studied the anatomical and aetiological causes of blindness among students of schools for the blind.[1-3] A large number of children with low vision also study in these schools, either due to lack of facilities for low vision care, or to lack of awareness regarding integrated education for those with low vision disability. Often these children are only assessed at the time of admission and not subsequently revaluated. Hence the progress of their eye condition often goes unnoticed and even those whose sight could be improve are deprived of the advances in management; hence, periodic eye examination of all students is recommended.[4]

In Saudi Arabia, visual acuity and refraction services are given to all students through the Ministry of Education (MoEd).[5] The schools for the visually challenged are also governed by the MoEd. In Al-Hassa region of Saudi Arabia, there are two such schools (one for male and other for female children). We conducted a study to estimate the rate of low vision disability and causes of severe visual impairment (SVI) and moderate visual impairment (MVI) among these students. We accordingly recommended policies to improve their eye care.

Methods

The Ethical Committee of Al-Jabr Eye and Ear Hospital at Al-Hassa gave permission to undertake this study. This 'case series' type of study was conducted from June to December 2006. Of the 120 Saudi students attending the male and female schools for the blind, which make up the Al-Noor Institute for the Blind in Al-Hassa, Saudi Arabia, 61 students with either MVI or SVI were included in the present study. The remaining 59 students with absolute blindness (no light perception) were excluded from our study.

The eye examination was conducted in two phases. In Phase I, a team of an optometrist and an ophthalmologist examined the subjects at the eye department of Al-Jabr Eye and Ear Hospital.

The optometrist noted the best corrected visual acuity (BCVA) using Snellen's distant vision chart, held at a three metre distance. We performed dynamic refraction and then added correction in the trial frame; a 100% contrast chart for this purpose. If the student could not identify symbols in the top line in the chart held at a three metre distance, we repeated the test at 1.5 meter distance from the chart. Refraction was performed using 0.5% tropicamide eye drops. The presenting and best corrected visual acuity of each eye was noted. The anterior segment of eye was examined using slit-lamp biomicroscope (Topcon, Japan). The posterior segment was evaluated using an indirect ophthalmoscope (Keeler, UK) and +20 D fundus lens (Volk, Germany). Cover test, ocular motility and visual field (confrontation method) were performed for most of the students as their vision allowed. MVI was defined as BCVA of 6/18 to 6/60. SVI was defined as BCVA of <6/60 to 3/60.[6]

Those who were advised to have further investigations, treatment and rehabilitation were evaluated in Phase II of the study at King Khaled Eye Specialist Hospital in Riyadh. There, further special ophthalmic and neurologic evaluation and investigations were conducted as advised by the paediatric ophthalmologist.

Table 1: Causes of visual impairment (vision <6/18 to 3/60)

Causes	Eyes	%
Hereditary retinal disorders	68	55.7
Congenital glaucoma	16	13.1
Cataract and uncorrected aphakia	9	7.4
Primary optic atrophy	6	4.9
Subluxated lens	3	2.5
Aniridia	2	1.6
Other *	19	15.6
Undetermined	2	1.6
Refractive error	112	91.8

*Note: * Other includes: ptosis, retinal detachment, phthsis bulbi, cryptophthalmos and corneal scars*

They included computed tomography (CT) and magnetic resonance imaging (MRI) scanning, electroretinography (ERG), and electrooculography (EOG).

The classification of causes of childhood blindness was per the recommendation of the World Health Organization (WHO) expert group.[7] Both the anatomic site of the principal cause of visual impairment (VI), and the disease causing VI were used to classify the causes in our study. The data was collected on a pre-tested form and was then entered into a spreadsheet (Microsoft Excel). Frequency and percentage proportions were calculated for qualitative variables. For quantitative variables, we calculated the mean and the standard deviation.

Table 2: Low vision aids and care given to children with moderate and severe visual impairment

Low Vision aid	Number of children	%
Magnifiers	38	62.3
Telescopes	27	44.3
Filters	6	9.8
Non-optical low vision devices (felt tip pen, writing frame, table lamp, cap with eye shade)	52	85.2
Close circuit television (CCTV)	10	16.4
Continuation with same spectacles	6	9.8
Prescribed change in spectacle power	3	4.9
Counselling to children and parents	61	100

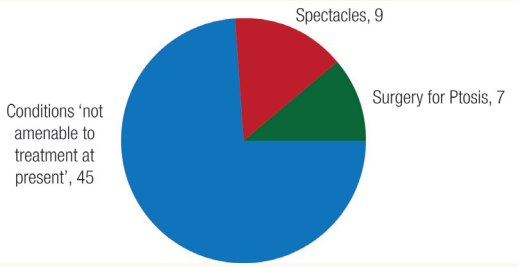

Figure 1: Distribution of children with visual impairment by type of intervention

Students with eye conditions that were amenable to treatment were offered free treatment. Those in need of rehabilitation were provided with low vision aids and training by experts. The outcomes of the study were discussed with the health and education authorities of the region to improve the quality of life of children with MVI and SVI.

Results

Our series had 61 students and their 122 eyes. There were 27 (44.2%) male and 34 (55.8%) female students. The mean age of the students was 13.59 years (standard deviation 3.97 years). A history of consanguinity was found among parents of 53 students (87%). In 12 (9.8%) eyes, the BCVA was ≥6/18 and in 28 (23%) eyes, it was <3/60. MVI and SVI were found in 82 eyes (67.2%).

The causes of visual impairment are given in Table 1. The retina was the main anatomical site of pathologies responsible for visual disabilities. Hereditary retinal disorders were the cause of low vision in 68 (58%) eyes. Retinitis pigmentosa was found in 30 (44.1%) eyes. Other causes included hereditary vitreoretinal degenerations; Stargardt's disease and cone-rod dystrophy—each of these were found in 8 eyes (11.7%); chorioretinal degenerations in 6 (8.8%) eyes; congenital hypoplastic macula in 4 (5.9%) eyes, and foveal hypoplasia in 4 (5.9%) eyes.

Refractive errors were found in 112 (91.8%) of the total 122 eyes; however, it was the single identifiable cause of the visual impairment in only 17 (14%) eyes. The refractive errors of hyperopia, myopia and astigmatism were found in 54 (44.2%) eyes, 55 (45%) eyes and 3 (2.5%) eyes respectively. We could not determine the type of refractive error in 10 (8%) of eyes. Most of these cases had an associated pathology responsible for the low vision.

Table 3: Rate and causes of severe visual impairment (SVI) among children at school for the blind in different studies

Author	Country	Year	Student Nos.	Rate (%) of SVI	Causes of Visual Impairment	Remark	Reference
Kasmann-Klenner B, et al.	Germany	1998	105		Optic atrophy 18%, albinism 12%, ROP 11%	SVI + Blind	24
DeCarlo DK, et al.	USA	1999	123	26.2	Optic nerve 31%, optic atrophy 24.1%, glaucoma 8%, lens 14%	SVI + Blind	23
Kocur I, et al.	Czech Republic	2001	229	21	Retina 54%, optic nerve 15%, globe 11%, lens 9%, ROP 42%	SVI + Blind	22
Titiyal JS, et al.	India	2003	703	3.1	Globe 27%, cornea 22%, lens 11%, retina 15%	SVI + Blind	21
Mirdehghan S, et al.	Iran	2005	362	81	Retinal diseases 51%	Low vision	3
Liu B, et al.	China	2007	177	8.5	ROP 38%, retina 12%, lens 4%, globe 3%, cornea 3%	SVI + Blind	17
Haddad M, et al.	Brazil	2007	3,210		Toxoplasma 21%, retinal dystrophy 12%, ROP 12%	Visually impaired children	18
Muhit MA, et al.	Bangladesh	2007	1,935		Lens 33%, cornea 27%, globe 13%	SVI + Blind	19
Gogate P, et al.	India	2009	891	3	Anomalies 36%, cornea 15%, retina 20%, lens 11%	SVI + Blind	20
Kanaskar I, et al.	Nepal	2009	285	7.4	Cornea 36%, retina 20%, globe 13%, lens 13%	SVI + Blind	2
Khandekar R, et al.	Oman	2010	47	28	Not ascertained	SVI + Blind	4
Present study	Saudi Arabia	2011	61	67	Retinal 66%, glaucoma 13%, Lens 7%	SVI + Blind	

Hyperopia of ≥+4.00 D was detected in two eyes (1.6%); myopia of ≥-5.00 D was noted in eight (6.5%) eyes, while in seven (5.7%) eyes anisometropia of ≥3.00 D sph or ≥1.50 D astigmatism were present.

Seven students (11.47%) had bilateral ptosis with a variable degree of amblyopia in the eye with more severe ptosis. All these 7 children were close relatives. They were referred to paediatric ophthalmologists for further care. Two underwent surgery while the others refused surgery as the visual prognosis was poor.

Isolated refractive error (9 students) and ptosis (7 students) were considered as potentially avoidable causes of visual impairment. Those with eye conditions 'not amenable to treatment at present', and having MVI or SVI, were grouped as cases that needed separate low vision care [Figure 1].

The details of low vision care provided to the children with MVI and SVI are given in Table 2. Low vision aids (optical and non-optical) seem to be useful for children with residual vision. Two out of 6 children who were advised to have corrective surgery underwent ptosis surgery. The others, when offered a guardedly optimistic prognosis, opted not to undergo an operation. We compared the rate

of SVI and causes documented in the literature to compare our study outcomes with these studies and the results are shown in Table 3. The magnitude and causes of visual impairment among students of the Al-Noor Institute for the Blind in the Al-Hassa province of Saudi Arabia matched the pattern found in other Gulf Cooperation Council countries and in industrialised countries.

Discussion

This is the first study to focus on visually impaired children enrolled in schools for the blind in the Al-Hassa region of Saudi Arabia. Previous studies in other parts of Saudi Arabia covered both blind and low vision children.[8–11] We have noted that the disabled students with a useful residual vision can be provided with low vision aids to improve their quality of life. Zamzam *et al.* in Kuwait and Al Alawi *et al.* in Bahrain also noted that the majority of the partially sighted children were given the same educational programme as their normal peers in ordinary schools.[12,13] Low vision students must not be trained along with the blind. An integrated educational approach for these children within the routine educational system is recommended.[14]

Our study suggests that genetic and hereditary diseases are significant causes of childhood visual impairment in the Al-Hassa region. This matched with the changing trends, from nutritional and infectious causes, to non-curable causes, contributing to visual disabilities in children of Saudi Arabia as noted by Tabara *et al.* and worldwide by Gogate *et al.*[15,16] It was challenging to compare our study outcomes to the findings of other researchers as most other studies conducted in schools for the blind, in developing as well as industrialised countries, had grouped blind and SVI students together. In developing countries, blindness and SVI were due to avoidable causes like poor nutrition and lack of timely treatment.[2,17–21] By comparison, in industrialised countries, they were mainly due to retinal, optic nerve diseases and birth defects.[22–24] A study in Iran showed an unusually high rate (81%) of SVI among children studying in schools for the blind and suggested that half of these cases were due to retinal diseases.[3]

The consanguinity rate in the Saudi population has been documented to be as high as 56%.[25] Our subjects had a consanguinity rate of 87%. As the former study was community-based and the present one is focusing on parents with at least one child with visual impairment (mainly due to hereditary causes) the difference in consanguinity rate is logical. Genetic counselling and explanation of the risk of birth defects among offspring of closely related parents is recommended.[26]

In our study, the focus was on visual acuity for distance and the correction of refractive error. Assessment of visual functions like contrast sensitivity, near vision, colour vision, glare, and field of vision was not carried out. More detailed assessment of visual functions for all children with sensory disability is recommended in the future.[27]

More than 10% of the eyes in our series had visual impairment due to congenital glaucoma. Trained primary physicians can easily detect this early on. Referring the patient to a paediatric ophthalmologist would confirm the diagnosis and lead to initiation of treatment at an earlier stage which would minimise visual disability.[28] Congenital cataract and aphakia contributed to the cause of visual impairment in 6.2% of those children reviewed at a tertiary eye centre in Saudi Arabia.[29] In our study, 7.4% of eyes had cataract or aphakia related visual impairment.

In spite of benefiting from free rehabilitative services, the study sample is less likely to be the representative of low vision children of the Al-Hassa Region of Saudi Arabia. Many students with visual disabilities could have double or multiple disabilities and hence might not be attending a school for the blind. Further studies to include all children with visual disabilities are suggested.

Although a large number of children in our series had a refractive error, many of them could not attain corrected vision due to the presence of co-morbidities. As children with high myopia experienced magnification after removing spectacles, they did not accept the use of spectacles**.** Thus care should be taken when prescribing visual aids to children with MVI or MVI with other co-morbidities.

In our study, we noted that 50% of the students had MVI or SVI. There are almost three million children worldwide who have the potential to benefit from low vision care,[30] yet many are rehabilitated along with the blind. Children with MVI or SVI must be trained separately from the absolutely blind children. Once they are proficient

in using low vision aids, they could be integrated into schools for sighted children.[31]

Conclusion

Retinal diseases were the main cause of SVI and MVI in our series. Children at the Al-Noor Institute for the Blind have low vision disabilities. The method of rehabilitating children whose SVI or MVI are due to causes for which there is no treatment should be different from that used for rehabilitating absolutely blind children.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

ACKNOWLEDGMENTS

We thank the administrators and staff of the Al-Noor Institute for the Blind in Al-Hassa region and the Al Jabr Eye and Ear Hospital for their support for this study. We also appreciate the cooperation of the students and their parents.

References

1. Muhit M, Gilbert C. A review of the epidemiology and control of childhood blindness. Trop Doct 2003; 33:197–201.
2. Kansakar I, Thapa HB, Salma KC, Ganguly S, Kandel RP, Rajasekaran S. Causes of vision impairment and assessment of need for low vision services for students of blind schools in Nepal. Kathmandu Univ Med J (KUMJ) 2009; 7:44–9.
3. Mirdehghan SA, Dehghan MH, Mohammadpour M, Heidari K, Khosravi M. Causes of severe visual impairment and blindness in schools for visually handicapped children in Iran. Br J Ophthalmol 2005; 89:612–4.
4. Khandekar R, Shah R, Shah M, Al Harby S, Vora U, Al Balouchi F. Ocular status and functional adaptation of visually challenged children of a special school in Oman. Oman J Ophthalmol 2011; 4:17–20.
5. WHO Country Representative. Eye health through school health. Presentation at Workshop on Integration of Eye Health into Primary Health Care. World Health Organization EMR, Dubai, Feb 2011.
6. Dandona L, Dandona R. Revision of visual impairment definitions in the International Statistical Classification of Diseases. BMC Med 2006; 4:7.
7. Gilbert CE, Foster A, Negrel AD, Thylefors B. Childhood blindness: A new form of recording causes of vision loss in children. Bull World Health Org 1993; 71:485–9.
8. Tabbara KF, Elsheikh HF, Shawaf SS. Pattern of childhood blindness at a referral center in Saudi Arabia. Ann Saudi Med 2005; 25:18–21.
9. Tabbara KF. Childhood blindness in Saudi Arabia. Saudi J Ophthalmol 2004; 18:13–16.
10. AlRajhi AA, Awad A, Badeeb O. Causes of blindness in students attending schools for the blind in Saudi Arabia. Saudi J Ophthalmol 2003; 17:276–80.
11. Badr IA, Qureshi IH. Cause of blindness in the Eastern province blind schools. Saudi Med J 1983; 4:331–8.
12. Zamzam AM, AlRabiha SM. Causes of blindness at the Al-Noor Institute for the Visually Handicapped in Kuwait. Saudi J Ophthalmol 1998; 12:1–8.
13. AlAlawi E, Ahmed AA. Causes of visual disability at the Al-Noor Institute for the Visually Impaired in Bahrain. Saudi J Ophthalmol 1998; 12:101–6.
14. Wilkinson ME, Stewart IW, Trantham CS. Iowa's pediatric low-vision services. Optometry. 2000; 71:40–8.
15. Tabbara KF, Badr IA. Changing pattern of childhood blindness in Saudi Arabia. Br J Ophthalmol 1985; 69:312–5.
16. Gogate P, Deshpande M, Sudrik S, Taras S, Kishore H, Gilbert C. Changing pattern of childhood blindness in Maharashtra, India. Br J Ophthalmol 2007; 91: 8–12.
17. Liu B, Huang W, He M, Zheng Y. An investigation on the causes of blindness and low vision of students in blind school in Guangzhou. Yan Ke Xue Bao 2007; 23:117–20.
18. Haddad MA, Sei M, Sampaio MW, Kara-José N. Causes of visual impairment in children: A study of 3,210 cases. J Pediatr Ophthalmol Strabismus 2007; 44:232–40.
19. Muhit MA, Shah SP, Gilbert CE, Foster A. Causes of severe visual impairment and blindness in Bangladesh: A study of 1935 children. Br J Ophthalmol 2007; 91:1000–4.
20. Gogate P, Kishore H, Dole K, Shetty J, Gilbert C, Ranade S, et al. The pattern of childhood blindness in Karnataka, South India. Ophthalmic Epidemiol 2009; 16:212–17.
21. Titiyal JS, Pal N, Murthy GV, Gupta SK, Tandon R, Vajpayee RB, et al. Causes and temporal trends of blindness and severe visual impairment in children in schools for the blind in North India. Br J Ophthalmol 2003; 87:941–5.
22. Kocur I, Kuchynka P, Rodny S, Barakova D, Schwartz EC. Causes of severe visual impairment and blindness in children attending schools for the visually handicapped in the Czech Republic. Br J Ophthalmol 2001; 85:1149–52.
23. DeCarlo DK, Nowakowski R. Causes of visual impairment among students at the Alabama School for the Blind. J Am Optom Assoc. 1999; 70:647–52.

24. Kasmann-Kellner B, Hille K, Pfau B, Ruprecht KW. Eye and general illnesses in the public school for blind and visually handicapped students in Saarland. Developments in the last 20 years. Ophthalmologe 1998; 95:51–4.

25. El Mouzan MI, Al Salloum AA, Al Herbish AS, Qurachi MM, Al Omar AA. Consanguinity and major genetic disorders in Saudi children: A community-based cross-sectional study. Ann Saudi Med 2008; 28:169–73.

26. Khandekar R, Jaffer Y. Incidence and determinants of birth defects and enzyme deficiencies among live births in Oman: A review of the 2005 National Register. Sultan Qaboos Univ Med J 2010; 10:23–30.

27. Vora U, Khandekar R, Natrajan S, AlHadrami K. Refractive error and visual functions in children with special needs compared with the first grade school students in Oman. Middle East Afr J Ophthalmol 2010; 17:297–302.

28. Walton DS, Katsavounidou G. Newborn primary congenital glaucoma: 2005 update. J Pediatr Ophthalmol Strabismus 2005; 42:333–41.

29. Tabbara KF, ElSheikh HF, Shawaf SS. Pattern of childhood blindness at a referral center in Saudi Arabia. Ann Saudi Med 2005; 25:18–21.

30. Gilbert CE, Ellwein LB. Refractive Error Study in Children Study Group. Prevalence and causes of functional low vision in school-age children: Results from standardized population surveys in Asia, Africa, and Latin America. Invest Ophthalmol Vis Sci 2008; 49:877–81.

31. Moller MA. Working with visually impaired children and their families. Pediatr Clin North Am 1993; 40:881–90.