

Vision screening services in special needs schools in Western Saudi Arabia

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ABSTRACT

الأهداف: تقييم وضع خدمات فحص النظر في مدارس رعاية ذوي الاحتياجات الخاصة في المنطقة الغربية في المملكة العربية السعودية.

الطريقة: هذه دراسة مستعرضة تمت بتوزيع استبيانات إلى كل مدارس تقديم الرعاية النهارية في المنطقة الغربية في المملكة العربية السعودية وعددها 30 مدرسة بين أبريل و مايو 2018م.

النتائج: تجاوبت 23 مدرسة مع إجراء الدراسة (معدل الاستجابة 77%). بلغ عدد التلاميذ في المدارس التي شملتها الدراسة 1831 تلميذ. في المتوسط، 10.8% من التلاميذ يرتدون النظارات. أفاد حوالي 60.9% من المدارس أن فحص النظر لا يتم تقديمه في المدرسة. كانت النسبة المئوية للطلاب الذين استخدموا الوسائل المساعدة لضعف البصر (البصرية وغير البصرية) أو الوسائل التي تعتمد التكنولوجيا المتطورة أقل من 2.7%. كما أفاد معظم الممثلين الإداريين للمراكز المشاركة (78.3%) بأنه لا أحد في مدارسهم قد تلقى أي نوع من التدريب النوعي للتعامل مع الطلاب الذين يعانون من إعاقات بصرية ودعمهم.

الخلاصة: في المنطقة الغربية من المملكة العربية السعودية، وضع الرعاية البصرية للأفراد في مدارس ذوي الاحتياجات الخاصة ضعيف. لتقديم خدمة أفضل لهذه الفئة المحرومة، ينبغي النظر في ضرورة تنفيذ برامج فحص الرؤية على نطاق أوسع.

Objectives: To evaluate the current status of vision screening services in special educational needs (SEN) schools in the western region of Saudi Arabia.

Methods: This was a cross-sectional study that involved distribution of a questionnaire to all 30 SENs schools in the western region of Saudi Arabia between April and May 2018.

Results: Twenty-three schools responded to the questionnaire (77% response rate). The number of pupils represented in the surveyed schools was 1831. On average, 10.8% of pupils were reported to wear eyeglasses. Approximately 60.9% of schools reported

that vision screening was not offered at their schools. The percentage of students who used optical, non-optical, or high-technology low-vision aids was <2.7%. Most participants (78.3%) reported that no one in their schools had received some form of training to work with and support students with visual impairments.

Conclusion: In the western province of Saudi Arabia, the vision care status of individuals with intellectual disabilities (ID) in SEN schools is poor. To better serve this underprivileged group, the necessity of implementing vision screening programs on a larger scale should be considered.

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In up to 86% of cases, children with special educational needs (SEN) are at a higher risk of having oculo-visual disorders than are children with normal intellect.¹⁻⁴ Most causes of visual impairment in children with SEN, such as refractive errors, strabismus, inadequate accommodation, and cataracts, are preventable and treatable.^{5,6} Vision is considered to be one of the most important senses for children with disabilities because they greatly depend on visual inputs for communication and understanding.^{7,8} Unfortunately, in such children, visual problems tend to be overlooked because the focus is largely on their primary disability.⁹ Moreover, performing eye examinations with these children can be

challenging and time-consuming, requiring more skills than is needed for children without SEN.⁷ Nevertheless, addressing any visual deficit, however minor, could drastically improve the overall social development, academic performance, and learning of children with SEN.

In the past decade, research has confirmed the importance of early detection and treatment of oculo-visual disorders.¹⁰ However, in developing countries, there is a lack of understanding and awareness about these potentially preventable visual problems. In the Kingdom of Saudi Arabia (KSA), guidelines for vision screening in children, particularly those with intellectual disabilities (ID), are not systematically followed. Therefore, this study sought to evaluate the current status of vision screening and eye care in SEN schools in the western region of KSA.

Methods. This cross-sectional study was conducted by distributing a questionnaire designed by Woodhouse et al,¹¹ to 30 SEN schools in the western region of KSA between April and May 2018. The list of SEN schools was provided by an official representative of the Ministry of Labor and Social Development, and permission to use the questionnaire was granted by the original authors.¹¹ The inclusion criteria for schools was being a SEN school located in the western region of KSA. The exclusion criteria for schools was an incomplete survey response.

This survey was designed to obtain information about the vision screening services available at these SEN schools and about their students with known ocular or visual problems. The questionnaire was translated into Arabic by bilingual ophthalmologists. Irrelevant questions or terminology that did not apply to our region were omitted or slightly modified according to our needs. The questionnaire comprised 22 questions: 16 closed questions and 6 open-ended questions.

The questionnaire was addressed to the senior administrative staff of each school. All data were collected by hand in the form of hard copies from each SEN school. Follow-up telephone calls were made to 12 schools that did not return the questionnaire by the deadline. In total, 23 schools completed and returned the questionnaires (76.7% response rate).

The Research Ethics Committee, Faculty of Medicine, King Abdulaziz University Hospital, Jeddah, KSA, granted approval to conduct this survey.

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Patient and public involvement. No patients were directly involved in this study.

Statistical analysis. The obtained data were analyzed using the Statistical Package for the Social Science (SPSS) Version 23 (IBM Corp., Armonk, NY, USA). Simple descriptive statistics were used to define the characteristics of study variables. Specific and nominal variables are presented as percentages and counts, whereas continuous variables are presented as means and standard deviations. Assuming that vision screening services in SEN schools in the western region of KSA are not followed by approximately 95% based on several national reports on vision screening, a total of 30 SEN schools, and an expected response rate of 76%, the study would require a sample size of 22 to estimate the expected proportions with 95% confidence and 5% absolute precision.¹²⁻¹⁴ The Chi-square test was used to assess relationships between categorical variables, whereas an independent t-test was used to compare means between the 2 groups. These tests were performed under the assumption of the data being normally distributed. Pearson's correlation coefficient was used to determine the dependency of the 2 continuous variables. The null hypothesis was rejected at $p < 0.05$.

Results. Demographic data. The total number of students represented in all the surveyed schools was 1831. Children aged <12 years were heavily represented in 22/23 (95.7%) schools, followed by those aged 12-18 years in 12/23 (52.2%) schools and >18 years in 7/23 (30.4%) schools. As shown in Table 1, Down syndrome was the most frequently documented cause of ID, followed by autism, and undiagnosed mental retardation. Other diagnoses included Angelman, Sanjad-Sakati, Edward, Williams, and cri du chat syndromes.

Glasses-wearing students. On average, 10.8% of students wore glasses. Approximately half of the schools surveyed (47.8%) reported that some of their students with prescribed glasses refused to wear them. Schools that referred students to medical health centers for specialized care were found to have a higher percentage of students who wear glasses (11.8%) than schools without a referral system (8.4%); however, the difference was not statistically significant ($p=0.230$). Furthermore, the percentage of students who wore glasses in schools that performed vision screening (9.7%) was slightly higher than that in schools without on-site vision assessments (6.71%; $p=0.188$).

Vision screening. Of the schools surveyed, 60.9% reported that vision screening was not offered at their schools. In schools that performed vision screening, the

examination was conducted by a school nurse (13%), ophthalmologist (8.7%), or teacher (8.7%) (Table 2). Vision screening was mostly performed in children from younger age groups (<7 years) in 5/9 schools and 7-12 year-old children in 3/9 schools. When comparing schools offering vision screening with those that did not, no predilection for younger age groups was identified. Moreover, in schools with vision screening, not all children had their vision assessed as part of the screening process (7/9 schools). Only 2/9 schools performed vision screening on all students. More than half of the schools surveyed (52.2%) reported that it was not mandatory for students to undergo vision screening at the time of registration as a prerequisite for enrollment. In 4/11 schools that did not perform on-site vision screening, it was not mandatory for students to undergo vision screening at the time of registration ($p=0.021$). Seventy percent of the schools surveyed collaborated with a medical health center to refer students in need

of specialized care. However, 73% of these cases were referred to private sector practitioners, whereas only 27% of cases were referred to public sector practitioners. Of the schools that performed vision screening, 50% collaborated with specialized medical health centers. When an off-site vision assessment was performed, the schools received a copy of the report for most or all of the cases (57%); however, for the remaining cases, the schools did not receive off-site vision screening reports.

The schools that performed on-site vision screening were more likely to refer students to eye care practitioners upon suspicion of visual impairment than were those that did not offer vision screening ($p=0.022$). Lastly, official school awareness of the increased prevalence of visual disorders in children with ID did not affect the proportion of students who underwent vision assessment ($p=0.493$).

Known or suspected visual impairment in students.

Out of 1831 students, 74 students had their primary disability recorded as visual impairment (3±4 students per school; range: 0-13). The percentages of students who did not wear glasses but had suspected visual impairments for near objects were 5.6% or far objects were 4.5%. Moreover, a higher percentage of students who underwent vision assessment as part of their vision screening had visual impairment recorded as their primary disability (4.8%) than those who did not undergo vision assessment as part of their vision screening (2.2%); however, the difference was not statistically significant ($p=0.126$).

Low vision aids and adaptations. On average, 1±4 (range: 0-15) students were reported to use optical and

Table 1 - Spectrum of diagnoses in enrolled children.

Clinical diagnosis	n (%) of schools*
Down syndrome	22 (95.7)
Autism	21 (91.3)
Mental retardation	21 (91.3)
Attention deficit hyperactivity disorder	8 (34.8)
Cerebral palsy	7 (30.4)
Others	4 (17.4)
All disabilities	3 (13.0)

*The total is >100% because some children may have more than one diagnosis.

Table 2 - Vision assessment and training of staff in vision screening performed in schools.*

Staff member	Schools with staff members who perform vision screening (n=9)	Schools with staff members who had some sort of training to deal with VI students (n=23)	Willingness of staff members in schools to undertake training to deal with VI students (n=23)
Teacher	2 (22.2)	5 (21.7) Proportion of teachers: 3 out of 5 (60) All teachers: 2 out of 5 (40)	Unlikely: 5 (21.7) Possible: 9 (39.1) Very possible: 9 (39.1)
Other Staff			
School nurse	3 (33.3)	1 (4.3)	- Unlikely: 8 (34.7)
Ophthalmologist	2 (22.2)	0 (0)	- Possible: 8 (34.7)
Pediatrician	1 (11.1)	0 (0)	- Very possible: 7 (4)
Optometrist	1 (11.1)	0 (0)	
Outside the school	1 (4.3)	N/A	
Social worker	0 (0.0)	1 (4.3)	
Psychologist	0 (0.0)	1 (4.3)	

Values are presented as number and percentage (%). GP - general practitioner, N/A - not applicable, VI - visually impaired

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			Unlikely	Possible	Very possible
Teacher	2 (22.2)	5 (21.7) - Proportion of teachers: 3 out of 5 (60) - All teachers: 2 out of 5 (40)	5 (21.7)	9 (39.1)	9 (39.1)
<i>Other staff</i>					
School nurse	3 (33.3)	1 (4.3)			
Ophthalmologist	2 (22.2)	0 (0)			
Pediatrician	1 (11.1)	0 (0)			
Optometrist	1 (11.1)	0 (0)	8 (34.7)	8 (34.7)	7 (4)
Outside the school	1 (4.3)	N/A			
Social worker	0 (0.0)	1 (4.3)			
Psychologist	0 (0.0)	1 (4.3)			

*The data represent the number of schools and are presented as frequency (percentage).
GP - general practitioner, N/A - not applicable, VI - visually impaired.

1±1 (range: 0-5) used non-optical devices. Moreover, 3±5 (range: 0-15) students per school used high-tech low-vision aids.

Thirty percent of the survey participants always adapted their school environment to meet the requirements of students with visual impairments. A similar proportion of participants adapted their surroundings sometimes, and 17.4% of participants adapted their surroundings most of the time. In 21.7% of cases, the surroundings were never adapted to meet the requirements of children with visual impairments.

Staff training and development. Most participants (78.3%) reported that no one in their school had received any training to work with and support students with visual impairments. More than two-thirds of the participants (69.7%) were aware that children with ID had increased chances of misalignments, refractive errors, and eye disorders. Over half of the participants (52.2%) were aware that a significant proportion of students had preventable visual impairments secondary to uncorrected refractive errors. Many of the participants (82.6%) agreed with the benefits of performing routine vision screening for these students. Participant comments on ways to improve the vision screening process included regular check-ups using fun tools, recruiting specialized doctors trained to deal with children with SEN, parental education on the necessity of regular eye check-ups, and the Ministry of Health mandating eye examinations at registration.

Discussion. Children with disabilities are completely reliant on visual inputs from their environment for their educational and personal needs.⁷ If a child with a disability also has a visual handicap,

then it will affect their overall development to a greater extent than it would affect that of a normal child.¹⁵ Unfortunately, the risk of visual impairment in non-visually disabled children is considerably higher than that in children without disabilities.¹⁵ In our study, vision screening was inconsistent across the 23 schools surveyed. A high percentage of students (60.9%) did not undergo examination of vision at school despite the known high prevalence of visual disorders in children with SEN.^{10,11,16} Our results for the western region of KSA appear to reflect higher rates than those reported for Wales, Northern India, and Nepal.^{10,11,16} In these studies, inconsistent vision screening was observed across schools, with 40-47% of students reporting no previous eye examination.^{10,11,16} Our findings are discouraging; however, a possible justification for this outcome may be the lack of implementation of vision screening guidelines in children within the KSA.¹² We believe that this situation may have led to many oculo-visual disorders going undetected during childhood, not only in children with ID, but also in their typically developing peers.¹⁰ The prevalence of uncorrected refractive errors in the western region of KSA was 35% in typically developing children aged 3-10 years.¹³ Further indicating the need for vision screening implementation, Aldebasi et al,¹⁴ reported a relatively high prevalence of correctable visual impairment (16%) in 5176 screened children from the Central region of KSA. Vision screening personnel differed between schools. In most cases, screening was performed by school nurses (13%), followed by ophthalmologists (8.7%) and teachers (8.7%). In schools that screened children for visual disorders, screening appeared to be restricted to a certain age range. In our study, most

children underwent vision screening by 7 years of age, consistent with previous findings.¹¹

In this study, 3.22% of children were reported to have low vision as their primary disability. This percentage was lower than that reported by Das et al,³ which was 12.1% and Woodhouse et al,¹¹ which was 16.9%. However, our results were in line with those of other studies with respect to the number of students without a detected or previously diagnosed visual impairment, but who had difficulties seeing near (5.18%) or distant (4.15%) objects.^{3,11} The reported number of children with visual impairments was lower than the actual number of cases with visual difficulties. This discrepancy could justify the screening of these children by professionals. Additionally, in the given context, the detection of visual disorders may be too complex as a task for school staff or parents alone to perform.

Overall, only 10.8% of students in the surveyed schools wore glasses. This finding was relatively low compared to the known high prevalence of refractive errors in children with ID. In a cross-sectional study by Woodhouse et al,¹¹ 47% of screened children with ID were prescribed first-time glasses. In this study, only 30.3% of students always relied on their school to meet the needs of learners with visual impairments. Moreover, similar proportions of children sometimes or never relied on visual aids. Late detection of visual impairment has implications for children's academic performance and social interactions. Although most causes of visual impairment are treatable up to a certain age, the impairments become irreversible thereafter.

Most of the staff (82.6%) of the surveyed schools were fully aware of the higher risk of visual problems in children with SEN as well as the benefits of regular check-ups in these children. However, up to 78.3% reported that they did not receive any formal training on working with or supporting children with SEN and visual impairments. Thus, it is essential to emphasize the need for a unified protocol across the KSA and training schools. Such a protocol should prepare and qualify school staff to handle and detect visual disorders in children with SEN and refer them to specialized professionals.

Study limitations. This is one of few studies to examine the status of vision screening services for children with ID in KSA.^{13,17} A major limitation was the inability to reach out to all SEN schools to request their participation in this study. However, since this study had met the target size, it could be generalized to the Western region of KSA. Since we relied on schools to self-report, bias may have been introduced into the results. Furthermore, some participants were initially

hesitant to participate in the survey due to the fear of litigation; however, these participants were encouraged to participate after subsequent follow-up calls and explanations by the authors who clarified the aim of the study and assured participant confidentiality.

In conclusion, this study confirmed the findings and contributes further evidence that children with ID do not receive adequate eye care due to inconsistent screening. This finding highlights the need to raise awareness in the staff responsible for the care of SEN children, including pediatricians, school nurses, and teachers. There should be a particular focus on the importance of detecting visual disorders in children with SEN. Additionally, we believe it is necessary to develop strategies for vision screening and a service incorporating complete eye examinations for all children with SEN. National vision screening of children with disabilities, either by aiming for mandatory screening at certain ages (namely, as a prerequisite for school registration) or spreading awareness about the importance of eye care through educational community-based screening campaigns, could reduce the prevalence of visual disorders in children with SEN in KSA.

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