

Results of student vision screenings at primary schools in Oudomxay province, Lao PDR.

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Purpose: To evaluate and implement a school based child vision screening program, which would identify the causes of blurred vision, improve vision with glasses, and increase teachers' awareness of eye care.

Methods: Primary school vision screenings took place in 155 schools in two districts of Oudomxay Province in November and December 2016. The children were initially screened by teachers trained in vision screening using the Snellen chart at 6 meters and trained in how to prevent conditions such as conjunctivitis and eye injury. The results of the screening vision tests of all children were sent to Oudomxay Provincial Hospital Eye Unit by teachers. A team comprising of one ophthalmologist and one optometrist followed up with students identified with vision impairment at the schools to perform additional vision tests and eye exams. Children confirmed with refractive errors were provided glasses and those diagnosed with cataract and glaucoma were referred to the Ophthalmology Unit of the hospital.

Results: In total, 16,982 children (Female 8,273) aged 5-14 years old were screened. The vision impairment with available correction (one and both eyes) of 133 children (0.78%), and included 40.60% of children requiring spectacle provision. Other ocular abnormalities included corneal scar (32.22%), posterior segment disease (23.08%), cataract (3.76%), and glaucoma (1.50%). 155 primary schools teachers were trained in vision screening. The vision of 45 children was improved with eyeglasses for refractive error. This number is lower compared to that of neighboring countries.

Conclusion: Trained school teachers can play an important role in the prevention of childhood blindness.

Keywords: Vision screening, rural health care, visual impairment, children, pediatric ophthalmology, amblyopia, refractive error, corneal scar.

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Introduction

Background Information

Children's eyes are very sensitive and are easily affected by infections and nutritional deficiencies. Childhood blindness is caused by a number of diseases and conditions in low-income countries, such as vitamin-A deficiency, cataracts from rubella, corneal scarring from measles, strabismus, and retinopathy of prematurity.

Vision impairment means that a person's eyesight cannot be corrected to a "normal" level (VA is less than 6/18 to 6/60). Vision impairment may be caused by a loss of visual acuity, where the eye does not see objects as clearly as usual. It may also be caused by a loss of visual field.

Generally, visual disability and blindness are caused by eye diseases or/and related to systemic diseases, which might happen prenatally, or postnatally in childhood.

Statement of Problem

In the past there has been no National Student Vision Screening in Laos, the number of children with visual disability are still found in great quantities in rural areas, they have insufficient access to care, because the recognition of importance for primary eye care is still low and the condition of the environment still confront difficulties for examination.

In 2016, there were 458 primary schools with a total of 49,117 students (F 23,681) in Oudomxay Province, Lao PDR.

Table 1. The number of schools and students in primary school in Oudomxay province (2016)

No	District	Qty. of schools	Qty. of student	
			Total	Female
1	Xay	71	11,105	5,506
2	La	40	1,977	888
3	Namor	59	6,692	3,192
4	Nga	62	5,598	2,706
5	Beng	59	5,099	2,418
6	Houn	103	12,930	6,255
7	Pakbeng	64	5,716	2,716
	Total	458	49,117	23,681

The children at primary school are mostly in the age group of 5-14 years, these children's eye and vision are sensitive during growth development. If a child with vision impairment is not treated it can progress to become low vision or blindness.

The National Ophthalmology Center works with very few numbers of schools in four provinces (Louangprabang, Xiengkhuang, Savannakhet, and Champasak) to target screening school children.

Therefore, vision screening for students at primary school and finding out the causes of visual disability leading to a set of necessary and important data for measuring indices for the treatable and preventable of blindness for children at primary schools. The ophthalmologists and teachers collaborate in providing an adequate team in quantifying and analyzing the eye health of Lao PDR's children and identifying those at risk of blindness.

This study is aimed to evaluate and implement a school based child vision screening program, which would identify the causes of blurred vision, improve vision with glasses, and increase teachers' awareness of eye care. This information will enable us to find methodologies for prevention of blindness in the next phase.

Objective

General Objective

To study the percentage of vision impairment in students at primary schools in two districts of Oudomxay province.

Specific Objective

- To increase school teachers' awareness of eye care
- To determine the number/percentage of children with vision impairment
- To determine the major cause of vision impairment
- To improve vision with glasses

Expected Outcome

After the completion of this study, we hope to gain data and identify the cause of vision impairment in students attending the primary schools in two districts of Oudomxay province. In order to find preventive measures to reduce the number of childhood blindness and help children with refractive error who have not yet received treatment in these highly remote areas.

Materials and Methods

Study Design

This was a cross-sectional descriptive study, in collaboration with school teachers by trained in vision screening and trained in how to prevent conditions such as conjunctivitis and eye injury for schools teachers, applying quantitative method to obtain data visual disability, was carried out in 155 primary schools in two districts.

Study Site

This study sites are selected in 155 schools in two districts of Oudomxay province

- Xay district (92 schools)
- Namor district (63 schools)

Duration of Study

Between November, 2016 to December, 2016

Sampling Techniques

All students in 155 schools were screened vision by teachers using Snellen chart at 6 meters, the results of the screening vision tests of all children were sent to Oudomxay Provincial Hospital Eye Unit. A team comprised of one ophthalmologist and one optometrist followed up with students identified with vision impairment at the schools to perform additional vision tests and eye exams.

- **Inclusion Criterion**

Children who as been studying in 155 primary schools in two districts (class room 1-5) with no

regard to sex, age, tribe, religion, caste.

- **Exclusion Criterion**

- Mental retardation
- Student who is non-compliance to join in the study

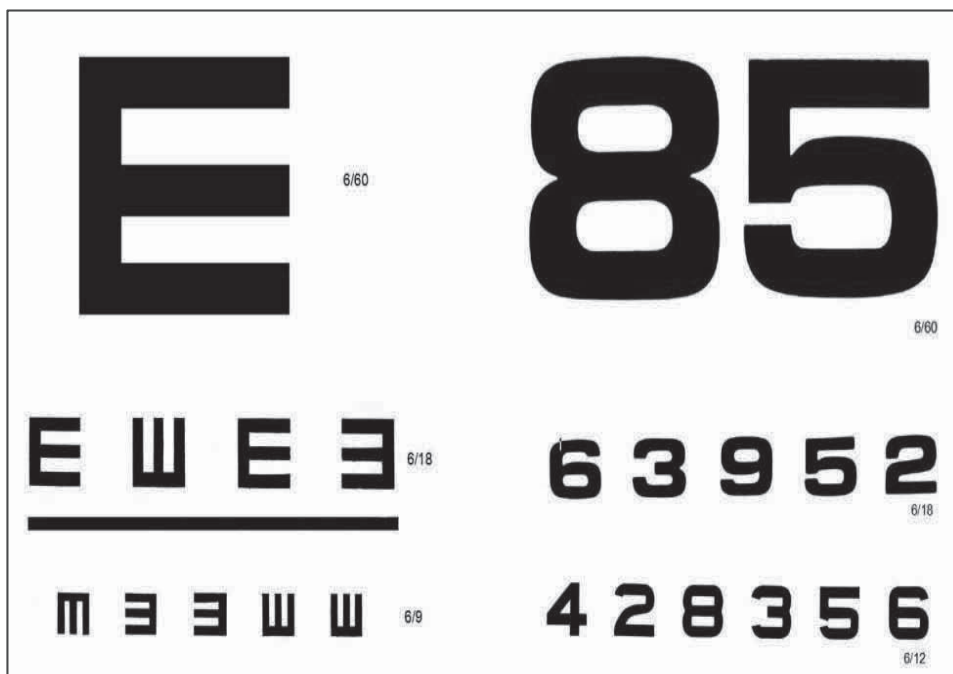
Sample Size

All students enrolled in the 155 primary schools in two districts in 2016 were included in the study.

Data Collection

During the academic year, 155 primary schools were screened for vision impairment by teachers trained by ophthalmologists. Data collected (form record) included: a name, age, visual acuity (right eye / left eye), which used E-chart, Snellen chart (figure 1)

Figure 1. E chart and Snellen chart



There are 60 primary schools where there are students with vision impairment, clinical/ophthalmic examination was performed on the eyes of children who suffered vision impairment by ophthalmologist and optometrist, included:

- Redo visual acuity test, which used E-chart, Snellen chart. The visual loss graded according to WHO classification of blindness and visual impairment.
- Intraocular pressure was measured by Schiottz tonometer for children who presented with signs and symptoms of glaucoma.
- Anterior segment examination was performed using a flashlight and portable slit lamp
- Posterior segment examination was performed using an indirect or direct ophthalmoscope after mydriasis by tropicamide 1%.
- Auto-refraction or refraction was performed for children who vision impairment with anterior and posterior segment were normal or/and better vision with pinhole. Optometrist has recorded the result of refraction. Children confirmed with refractive errors were provided glasses.
- Those diagnosed with cataract and glaucoma were referred to the Ophthalmology Unit of the hospital.

Data Analysis

The data was recorded on the vision test record form for children including the name, age and visual acuity (right/left eye).

All children with vision impairment were recorded on PBL eye examination record form including personal details of the child, visual assessment, eye examination, major site of abnormality leading to visual loss, prognosis for vision and full diagnosis. Data was entered analysed into a database in Excel version 2007.

The data was analysed to find out the percentage of the following:

- The distribution of sex and age
- The categories of visual impairment (graded according to WHO classification)
- An onset of visual impairment during infancy/childhood or before
- The cause of visual impairment or blind
- Number of students which could be improved vision by glasses

Results

Demographic Factors

In all 16,982 students participated, with a median age 9 years (rang, 5 years-15 years). Total enrollment numbered 16,982, with 8,709 (48.72%) were males and 8,273 (51.28%) were females, shows in (Table 2.). The vision impairment with available correction (one and both eyes) of 133 children (0.78%) with 62 (46.62%) were males and 71 (53.38%) were females, shown in (table 3.)

Figure 2. Age and sex distribution

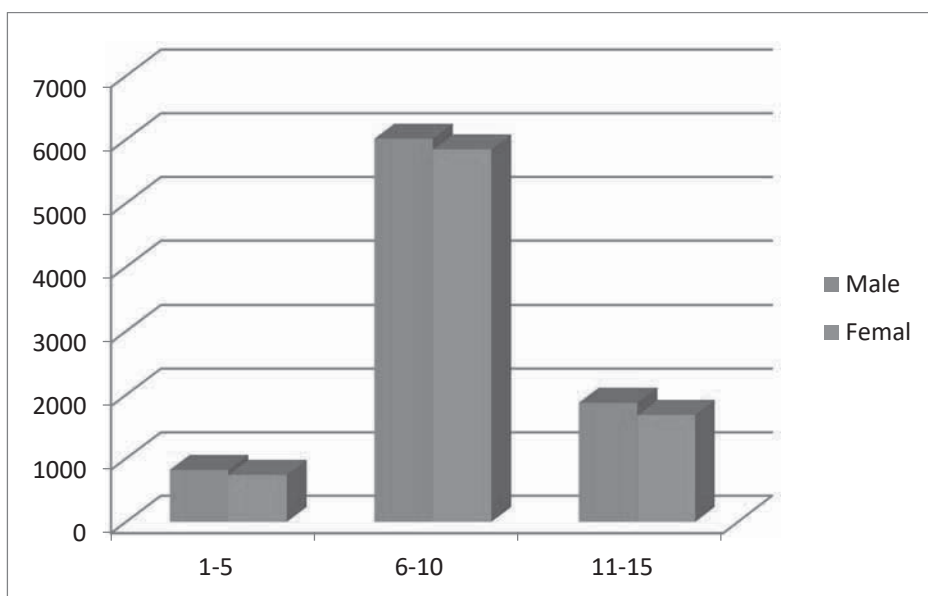


Table 2. The percentage of age and sex distribution

Age group	Male	Female	Total
1-5 years	821 (4.83%)	741(4.36%)	1,562 (9.20%)
6-10 years	6,012 (35.40%)	5,845 (34.42%)	11,857 (69.82%)
11-16 years	1,876 (11.05%)	1,687 (9.93%)	3,563 (20.98%)
Total	8,709 (51.28%)	8,273 (48.72%)	16,982 (100.00%)

Table 3. The age and sex distribution of children with visual impairment

Age group	Male	Female	Total
1-5 years	4	5	9
6-10 years	45	55	100
11-16 years	13	11	24
Total	62	71	133

The distribution of the visual acuity, based on WHO category, in worst eye (133 children) with available correction is shown in table 4.

WHO category	Level of visual acuity	Freq.	Percent
No impairment	6/18 or better	16,849	99.22%
Visual impairment	<6/18-6/60	64	0.38%
Severe visual impairment	<6/60-3/60	44	0.26%
Blindness	<3/60-PL	14	0.08%
Absolute blindness	No PL	11	0.06%
Total		16,982	100.00%

(No PL=no perception of light; PL= perception of light)

The distribution of the visual acuity base the WHO category, in better eye (44 children) with available correction is shown in table 5.

WHO category	Level of visual acuity	Freq.	Percent
No impairment	6/18 or better	16,938	99.74%
Visual impairment	<6/18-6/60	19	0.11%
Severe visual impairment	<6/60-3/60	22	0.13%
Blindness	<3/60-PL	3	0.02%
Absolute blindness	No PL	0	0.00%
Total		16,982	100.00%

(No PL=no perception of light; PL= perception of light)

Cause of Visual Impairment in worst eye (133 children)

Overall 80% of children with visual impairment has potentially avoidable (preventable and treatable), which refractive error was the first and most important cause followed by corneal scars. (table 6.)

Cause	Freq.	Percent
Refractive error	54	40.60%
Corneal scar	43	32.33%
Posterior segment diseases (traumatic 18 and other 11)	29	21.80%
Cataract	5	3.76%
Glaucoma	2	1.50%
Total	133	100.00%

Those diagnosed with cataract and glaucoma were referred to the Ophthalmology Unit of the hospital.

Prognosis for Vision

In this study, the number of cases where prognosis for vision could be improved and was treated was 60 (45.11%). These cases could be improved if it has been treated or with the best correction

- Refraction performed, distance visual acuity with corrective lenses provided to 45 children
- Cataract surgery performed on 5 children.
- Others, the visual acuity could be improved were corneal scarring if the eye has been treated by penetrating keratoplasty (PKP).

Discussion And Conclusion

This is the first study to screen vision and examine students enrolled in 155 primary schools in two districts in Oudomxay province. Although the initiative has not covered all schools, it is very helpful to detect cases at an early stage for prompt treatment in preventing amblyopia.

The results of this study shows refractive error (40.60%) to be the main cause of children with visual impairment. Our data also suggests that many children were never examined before and a lot of children do not like to wear glasses. However, we should advise the school teacher and the children's parents to become aware of this issue and involve them in improving vision for children.

Corneal scarring is the second most prominent cause of visual impairment in this study, corneal scarring in almost all cases occur when the child was by eye injury, infection, harmful traditional eye medicines predominate and from vitamin A deficiency.

The pattern of children with visual impairment in this study almost certainly reflects from primary healthcare, teachers' awareness of eye care and socioeconomic status of Laos, there is a need for promote primary eye care to community.

Trained school teachers can play an important role in the prevention of childhood blindness. Visual screening among school children should be one of the indicators that National Ophthalmology Center should assign primary school teachers to conduct visual screening in children every year at the beginning of school year to detect children with impairment vision.

Recommendations

The results of this study created a data base that contributes to a creation of a recommendation guideline for the prevention of blindness in children of Lao PDR:

- Screening of preschool children
- Strengthening primary eye care programs

Screening of preschool children is aimed at the early detection of certain disorders such as ocular deviation and amblyopia.

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