EVIDENCE BRIEF

Vision prescreening by teachers

(DCP4 ID: HEARVIS01)
Cluster: Hearing & Vision Improvement

FairChoices
DCP Analytic Tool

Vision prescreening by teachers: vision tests and provision of ready-made glasses on site by eye specialists.

Authors: Genet M. Hirpesa, Gunjeet Kaur, Øystein A. Haaland, Kjell Arne Johansson

Date: 9. November 2021

Date updated: 29. November 2021

Description of condition and intervention

Refractive error (RE) is the most common cause of visual impaired globally, also in low-and low-middle income countries among preschool children (Lei Wang, 2019). Which accounts for 0.48% of total disability adjusted-life years (DALYs) worldwide, 0.44% in low- and middle-income countries (LMICs) and 0.22% of in low-income countries (LICs), between 5-14 years old children ((GBD), 2019). The burden of this disease was yearly declined by -0.4% globally, LMICs (-0.54%) and LICs (-0.48%), where increased in Ethiopia by 0.19% ((GBD), 2019). Myopia is the one of the common problems of refractive error were estimated to increase from 312 million in 2015 to 324 million in 2025 globally in between 0 to above 19 years old children (Rudnicka AR, 2016). The prevalence of this problem was increased with age, for example the study in China shows that 2% at 4 years and 62.8% at 12 years (Wu Q, 2021). The Malaysia study found that the effectiveness of screening by teachers 0.89 which approximately 90% (Rokiah Omar, 2018). The effectiveness can be more than 90% in LICs, with insufficient eye service care, low specialists, and infrastructure. In this case the effectiveness of the vision prescreening by teachers can be assumed as 95-97%. This kind of intervention is very helpful to improve coverage and avoid the prevalence of RE among the children.

Vision screening by teachers in school is the most cost-effective intervention than the service at health care center by ophthalmologist to prevent cause of vision impairment among children. The school vision screening program guidelines included the purpose of the screening, grades to be included, equipment to be used and the procedures to be followed under all the key elements of the vision screening. The key elements are: 1. History and

EVIDENCE BRIEF

Vision prescreening by teachers

(DCP4 ID: HEARVIS01)
Cluster: Hearing & Vision Improvement

FairChoices
DCP Analytic Tool

external observation, 2. Distance visual acuity, 3. Near vison tests- Plus lens and near visions cards, 4. Near point of convergence, 5. Alternate cover test, 6. Stereo/Depth perception, and 7. Color vision screening.

International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
Colorado Department of PHE	Guidelines for School Vision Screening program: Kindergarten through grade 12	**yes**

Source: Colorado Department of Public Health and Environment

Intervention attributes

Type of interventions
Curative

Delivery platform
This intervention may be delivered at the community level.

Equity
In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

EVIDENCE BRIEF

Vision prescreening by teachers

(DCP4 ID: HEARVIS01)

Cluster: Hearing & Vision Improvement

FairChoices

DCP Analytic Tool

Time dependence

Low level of urgency. Treatment outcomes not highly affected by some days of delay.

Population in need of interventions

Treated population: Children in the age-group of 5 to 14 years. The treated fraction is estimated based on coverage rates of attending primary school level for both genders.

Affected population: Children (age group 5 to 14 years) with refractive disorders (prevalent cases), both genders. Affected fraction is assumed to be 100%.

Disease states addressed

This intervention targets to detect and treat refraction disorders in the target population.

Intervention effectiveness and safety

Table 1: Effectiveness and safety of vision prescreening by teachers

What happens?	No intervention	With intervention	Certainty of evidence	Transferability of evidence
Disability	0.90 reduction (Omar et al 2018)		High	

Model assumptions

Table 2: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	**Vision prescreening by teachers and provision of ready-made glasses on site by eye specialists**	
Cost calculation		
Treated population	children	Based on prevalence of refractive disorders
Gender	Both	
Age	5 to 14 years	
Treated fraction	1	Enrollment coverage at primary school level used to model the population
Effect calculation		

Vision prescreening by teachers

(DCP4 ID: HEARVIS01)

Cluster: Hearing & Vision Improvement

FairChoices

DCP Analytic Tool

Affected Population	Children	Those with refractive disorders or the condition
Affected gender	Both	
Affected fraction age	5 to 14 years	
Affected fraction	1	
Comparison	No intervention	
Disability Reduction (RRR)	0.90	Omar et al 2018

Intervention Cost

Vision screening by teachers and provision of ready-made glasses on site by eye specialists is estimated to cost 0.75 USD per person-year in specified population in low-income countries.

The total unit cost is estimated to be $0.68 (Year: 2020) per treated case per person in Ethiopia. The overhead total unit cost (including laundry, cleaning, and security) is estimated to be $0.18 per treated case per person in 2020.

References

Colorado Department of Public Health and Environment: Available here: *https://www.cde.state.co.us/sites/default/files/documents/healthandwellness/download/nurvisi onguidelines.pdf*.

GBD 2019: Global Burden Diseases tool. Available here: *https://vizhub.healthdata.org/gbd-compare/*.

Johansson KA et al 2020: Johansson KA, Coates MM, Økland JM, Tsuchiya A, Bukhman G, Norheim OF, Haaland Ø. Health by disease categories. Distributional Cost-Effectiveness Analysis: Quantifying Health Equity Impacts and Trade-Offs. 2020 Sep 30:105.

(WHO), W. H. (2021). Child mortality and causes of death. Available here: https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/child-mortality-and-causes-of-death.

Lei Wang, N. C. (2019). The cost-effectiveness of alternative vision screening models among preschool children in rural China.

Rokiah Omar, V. F. (2018). EFFECTIVENESS OF VISION SCREENING PROGRAM CONDUCTED BY PRE-SCHOOL TEACHERS. Malaysian Journal of Public Health Medicine, Special Volume (1): 41-50.

EVIDENCE BRIEF

Vision prescreening by teachers **FairChoices**
(DCP4 ID: HEARVIS01) DCP Analytic Tool
Cluster: Hearing & Vision Improvement

Appendix

Literature Review for effectiveness & safety

This literature search is an example of Level 1 search for intervention inputs taken from DCP3 or generated in an ad hoc manner (e.g., quick google search found one study of cervical cancer screening cost-effectiveness that was used to create an effectiveness parameter for that intervention).

Level of evidence of efficacy studies:

1. low (expert opinions, case series, reports, low-quality case control studies)

2. moderate (high quality case control studies, low quality cohort studies)

3. high (high quality cohort studies, individual RCTs)

4. very high (multiple RCTs, meta-analysis, systematic review, clinical practice guidelines)