



The **Fred Hollows**
Foundation



**Knowledge, Attitude, and Practice Related to the Use
of Glasses among Students, Parents and Teachers in
Nusa Tenggara Barat (NTB) Province**

FINAL REPORT

Knowledge, Attitude, and Practice Related to the Use of Glasses
among Students, Parents and Teachers
in Nusa Tenggara Barat (NTB) Province

Prepared By

Astri Ferdiana

Lina Nurbaiti

Putu Suwita Sari

Siti Farida ITSW

Wahyu Sulistya Affarah

Editors from The Fred Hollows Foundation

Evi Douren; Country Manager, Indonesia

Yadira Perez Hazel; Research Advisor, Australia

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EXECUTIVE SUMMARY

Globally, uncorrected refractive errors accounted for 20.9% of all blindness. In children and adolescents, visual impairment because of uncorrected refractive errors can have immediate and long-term consequences, such as low educational achievement, low motoric skills and poor social adaptation. Refractive errors can be easily diagnosed, measured and corrected with spectacles or other refractive corrections to attain normal vision. Correction of refractive errors with glasses is among the most cost-effective interventions in eye health care. However, misperceptions towards glasses still prevail in many areas.

In West Nusa Tenggara (NTB) Province, the prevalence of bilateral blindness in 2014 was 4%, and the majority (89%) of cases were avoidable. From a screening conducted by trained primary and junior high school teachers in 2018, there were 7.78% of students in NTB Province referred to the first level health facilities and 98 % were diagnosed with refractive error¹. Nevertheless, there has been no study on the perception towards glasses conducted in NTB Province.

STUDY AIMS

The present study aims to evaluate knowledge, attitude and practice (KAP) towards the use of glasses among students, parents and teachers in in NTB province. Specifically, this study aims to: 1) Measure knowledge, attitude and practices of parents and students related to eye health and the use of glasses for refractive error, 2) Measure opportunity, capacity and motivation of parents to engage in general eye health, 3) Identify factors related to parent decisions about buying glasses for their children, 4) Measure risky behavior leading to refractive errors in students and 5) Identify barriers and facilitators of the use of glasses in students.

STUDY DESIGN

The study was conducted in five selected districts in West Nusa Tenggara Province i.e. Mataram City, West Lombok, Central Lombok, East Lombok and West Sumbawa District between October to December 2019. A total of 12 primary and secondary schools in urban and rural areas were selected as study sites. Mixed-methods design combining quantitative and qualitative approaches was used, consisting of cross-sectional study of students and their parents or caregivers, focus group discussions (FGDs) with parents or caregivers and in-depth interviews with teachers in each school. A combination of instruments was

adopted for this study, including the Community Engagement in Eye Health Assessment Tool (CEEHAT) designed by The Fred Hollows Foundation (FHF). This is a tool to assess community opportunity, capacity and motivation to engage with eye health and care, and identification of areas for eye health service quality improvement.

A total of 366 parents participated in the study. Half of the parents lived in urban area. The majority were female (82.0%) with age mostly between 30-39 years old (41.3%) and 40-49 years old (32.2%). Most had low educational background with primary school education or lower. About 75.7% had monthly income below Rp 2,000,000 (AUD \$217.80). In Indonesia, one is in poverty under Rp 401,220 a month; however, this is based on spending and not on income². Insurance ownership was high (70.8%), with the national health insurance or BPJS as the most common type of insurance. Sixty percent of parents did not have any disability. Almost 20% had disability grade 1 and 14% had disability grade 2. Less than 10% of parents had disability grade 3 or 4.

A total of 373 students participated in the KAP survey, i.e. 90 (24.1%) from urban primary school, 127 (34.0%) from rural primary school, 96 (25.7%) from urban secondary school and 60 (16.1%) from rural secondary school. The mean age was 10.9 years and half were female.

Four FGDs were conducted in 4 schools (2 in urban, 2 in rural areas) involving 40 parents, of which 25 were female. Almost half of the parents had primary school education, with age ranged from 23 to 54 years old. A total of 12 teacher respondents were interviewed. Most teachers were male. Their age ranged from 22 to 55 years. The majority were physical education, contract-based teacher with bachelor degree education. The duration of work experience ranged from 4 months to 33 years.

Our **KEY** findings for each research question were as follows:

Knowledge, attitude and practices of parents and students related to eye health and the use of glasses for refractive error.

- **Knowledge of parents on eye health and low vision was low.** One third of parents (29.5%) did not know or could not mention correctly the cause of low vision, 44.5% did not know the signs of low vision and 68.6% did not know the treatment of low vision. When measured using the understanding domain of CEEHAT, the overall score was 11.4 ± 1.17 which is rather low. Low score

on CEEHAT understanding was associated with older age of parents, lower educational level, lower income and urban area.

- **Knowledge of students on low vision was low.** Although 62.8% of students were able to identify correctly at least one cause of low vision, only 37% of students were able to identify correctly at least one sign of low vision. Sixty percent of students did not know the treatment for low vision. The highest proportion of students with correct answer on the sign and cause of low visions was found in students of urban secondary schools (p-value=0.00 and p-value=0.015, respectively).
- **The attitude of parents towards glasses were moderately positive.** For the majority of parents, glasses were not perceived as causing discomfort (62.9%), worsening vision (85%) or limiting activities (57.9%).
- **The attitude of students towards glasses were moderately positive.** Among students, 78.8% disagree that glasses will worsen vision, 60.6% disagree that wearing glasses is uncomfortable and 60.9% disagree that wearing glasses will restrict activities. The proportion of students who perceived that glasses will worsen vision was higher in primary school (p-value<0.00).
- **Utilization of eye healthcare including for children was low.** Ninety percent parents never obtained eye examination for their children. There was also a common belief that eye healthcare can be obtained at specialists or optics. Only 35% parents mentioned that eye healthcare can also be accessed at primary health centers.
- **The use of traditional medicine is still common.** Nearly 40% of the parents especially those who were low educated would first go to a traditional healer or use home remedies for eye problems (p-value=0.002).

Measure opportunity, capacity and motivation of parents to engage in general eye health

- **Parents had moderately high motivation to engage in eye healthcare.** The mean score of CEEHAT motivation was 14.4 ± 1.4 . Higher CEEHAT motivation was significantly associated with higher education, higher income and having insurance (p-value<0.05). Higher disability level was significantly associated with lower CEEHAT motivation score (p-value<0.05).
- **Trust in modern eye healthcare was moderately high.** The mean score of CEEHAT trust was 14.6 ± 1.4 . Parents who lived in rural areas had higher trust to local eye healthcare (p-value<0.05). Those with health insurance had higher trust to local eye healthcare (p-value<0.05).

- **Opportunity to engage with eye healthcare was quite high.** The mean score of CEEHAT opportunity was 18.0 ± 1.8 . Parents with higher education and income level had higher CEEHAT opportunity score (p-value<0.01 and p-value<0.05, respectively). Those with higher disability level had worse CEEH opportunity score (p-value<0.05).

Factors related to parent decisions to buy glasses for their children

- **Belief that glasses are important when there is a medical indication.** During the FGD, parents expressed their belief that if there is a strong indication to use glasses, then it is acceptable for children to use glasses. Parents also believed that glasses should be used regularly (77.2%).
- **Strong belief that glasses are expensive.** The majority of parents (71.9%) perceived that glasses are expensive especially among parents with low educational level (p-value=0.026) and low income (p-value=0.004). It was also commonly perceived that glasses can only be obtained at specialized eye service or optics (51.1%).
- **Financial aid for buying glasses.** In the FGD, some parents and teachers expressed their expectation that glasses would be provided for free or at low costs for students who need glasses.
- **Easiness of access.** The percentage of those who wear, or own glasses, was higher than those ever been prescribed glasses (13.9% vs 9%, respectively), suggesting that there was some use of glasses without prescription. Purchasing glasses at street vendors were reported by some parents (23.5%), perhaps because it was easy to access.

Measure of risky behavior leading to refractive errors in students

- **Screen exposure from television and gadget was quite high among students,** with 70% students watched television every day with the duration of around 2 hours. Half of the students used gadget every day with the duration of around 2 hours as well. Students whose parents had low education had significantly longer duration of screen exposure from television (p-value=0.026) and gadget (p-value=0.020).
- **The use of traditional medicine for eye problems was still prevalent among parents.** This could be self-care at home using traditional remedies, or going to traditional healers to get cured. This could delay early detection of visual problems.
- **Less than 10% of students had visual problems.** Of 26 students with vision problem in one eye, 20 (76,9%) students came from household with parent income <2 million per month. Meanwhile,

of 20 students with vision problem in both eyes, 15 (75%) students come from parents with monthly income <2 million.

Identify barriers and facilitators for the use of glasses in students.

- **Barriers for the use of glasses:**

- *Knowledge on eye healthcare for children was low.* Almost no parent knew correctly how often and at what age eye check for children should be performed. This could be a barrier for early detection of any refractive error in students.
- *Knowledge on eye healthcare among parents was moderately low.* Parents knew where to go when they need an eye check-up and where to find information on health problems, but few had knowledge how often they should get an eye check-up
- *Knowledge on the availability of eye healthcare was low among parents and students.* Only 35% of parents knew that eye check can be performed at primary health centers. Around a third of parents did not know either where to buy or obtain glasses. Half of parents mentioned that glasses can be purchased at optics. Similarly, although most students were able to identify where to go to get an eye check (86%), they did not know where to buy glasses (41.4%).
- *Perception towards glasses was still negative in some parents and students.* Wearing glasses is still perceived as embarrassing or unattractive, limiting activities, and causing discomfort and also creating dependence.
- *The utilization of eye healthcare was very low.* Very few parents had experience in accessing eye health care such as having an eye check (12.3%), undergoing eye surgery (0.8%) and being prescribed glasses (9.0%). Those who had experience in using eye healthcare typically paid out-of-pocket (61.0%).
- *Lack of information regarding eye health.* Almost 80% of parents never received any information on eye health. Of those who received information on eye health, 40% obtained information from health workers. Similarly, only 30% students ever received information on eye health.
- *Costs seemed to be a major barrier to get eye check.* Despite the perceived importance of eye health, the majority reported that they would have difficulties paying for eye check (91.5%). In rural areas, transportation costs are major barrier because eye health care

services are mostly located in urban areas. Nevertheless, only half of the parents actually knew the costs for an eye check (52.7%).

- *Limited time for teachers to disseminate information and perform screening.* As teachers had teaching as the main responsibility as well as perhaps administrative duties, there was often limited time for them to disseminate information and to perform screening to students.
- *School health program was not well-implemented.* School health program could be one of media to disseminate information on eye health, and also to detect early any visual problems, however, in most schools this program did not run well.

- **Facilitators for the use of glasses:**

- *The benefit of glasses was well understood by parents and children.* Glasses were believed by more than 70% parents and students to improve vision or help people to see more clearly. Glasses were also perceived as improving appearance (58.5%) and hence confidence (60.4%).
- *The use of glasses in young people and children was not perceived negatively.* Adherence to the use of glasses was also perceived important.
- *Observation by teachers in the classroom.* During in-depth interviews, most teachers reported that they observed students with visual problems, and this could be one method to early identify students with visual problems.

Recommendations

- **For policy**

- In order to improve eye health programs for children especially for avoidable blindness, there should be better resource allocation by the government for the overall public health programs for eye health.
- Commitment should be gained from the district government through evidence-based advocacy to strengthen and allocate resources for eye health programs in their areas.
- To improve the participation of other relevant stakeholders such as the education sector, a working group should be established at the provincial or district level.

- The reactivation of school health program supported by the cross-sectoral collaboration is one of the keys to strengthen eye health programs for students. This could be done by reactivating the school health committee at the district level.
- **For practice**
 - As resources are limited, eye health programs should be targeted to children at risk, such as children in poorer areas with low level of education and income of the community.
 - Programs should be targeted to improve knowledge of parents, students and teachers, using culturally appropriate and acceptable information materials.
 - Information should be targeted at parents with poor knowledge and negative attitude, particularly those with low education and low income. Information should contain relevant messages as follows:
 - The importance of eye health for children
 - Where, how and how often eye checks should be performed for children
 - Causes, signs, prevention and treatment of visual problems in children
 - Benefits of glasses
 - Costs for eye healthcare and glasses
 - The involvement of teachers in eye health programs can potentially be beneficial to improve coverage of screening and information dissemination. However, in order to sustain this program, the following measures can be taken:
 - Gaining commitment from school stakeholders to support and motivate teachers to continue the school eye health program
 - Trained teachers should disseminate knowledge that they gained from training to school administrators and fellow teachers, especially classroom teachers who have intensive interaction with students.
 - Information on eye health and health in general should be incorporated in the lessons or everyday interaction between teachers and students.
 - Teachers can also help in disseminating information about visual health in the surrounding community surrounding the school
 - The skills of teachers in conducting screening of visual impairment needed to be maintained and improved.

- **For research**

- Effectiveness of school eye health programs should be further evaluated in research, with clear outcome and robust design.
- Research focusing on the development and effectiveness of culturally appropriate information, education and communication materials for eye health should be conducted using qualitative design.

INTRODUCTION

Background

Uncorrected refractive error is a major public health challenge. It is the leading cause of vision impairment and the second leading cause of blindness worldwide, affecting a total of 108 million people or 1 in 90 persons. In 2010, uncorrected refractive errors caused 20.9% of all blindness, and contribute to 44.2 to 48.1% of moderate severe visual impairments in all regions except South Asia which was as high as 65.4%¹. In children and adolescents, visual impairment because of uncorrected refractive errors can have immediate and long-term consequences, such as low educational achievement, low motoric skills and poor social adaptation². It is estimated that the prevalence of visual impairment among children aged 0-15 years in poor countries is around 9 per 10,000 children³.

Refractive errors can actually be easily diagnosed, measured and corrected with spectacles or other refractive corrections to attain normal vision. Correction of refractive errors with glasses is among the most cost-effective interventions in eye healthcare³. However, misperceptions towards glasses still prevail in many areas. It is frequently found that people are not using glasses even when prescribed by a specialist due to misbeliefs and attitudes of users, parents (if children) and the community, even teachers⁴.

In Indonesia, the burden of blindness and severe visual impairment is high, and a large proportion is actually avoidable⁴. A cross sectional study in Yogyakarta found that refractive error is one of the most common cause of visual impairment in school children. Based on the visual acuity examination and refraction correction in 410 school children from 36 elementary schools in 4 districts, 32.7 % of students was diagnosed with myopia and 8.5% of students was diagnosed with high myopia¹⁰. However, there are few studies that explore knowledge, attitude and practices (KAP) and perceptions towards the use of glasses in Indonesia.

The Rapid Assessment of Avoidable Blindness (RAAB) conducted in West Nusa Tenggara (NTB) Province in 2014 found that the prevalence of bilateral blindness was 4%, and that 89% of cases were avoidable. From a screening conducted by trained primary and junior high school teachers, there were 7.78% of students in the province referred to the primary healthcare facilities and 98 % were diagnosed with refractive error. However, there are few studies that explore perceptions, knowledge, attitude and practices towards the use of glasses in Indonesia and in NTB¹¹.

Rationale

In 2018, a school-eye health program supported by the Fred Hollows Foundation has been conducted in five districts in Nusa Tenggara Barat (NTB) Province aiming to address the growing problem of avoidable blindness in Indonesia. The Seeing is Believing or SiB project, will address different components. First is the awareness raising through activities to deliver eye health education to all primary and junior high schools and to increase community awareness about eye health and vision care practices. Second is capacity building by increasing human resource capabilities in visual acuity (teachers and primary health workers) and increasing selected primary healthcare workers' skills in refraction. Third is service provision by establishing a central Vision Centre in Mataram City to allow for the availability of high-quality low-cost eyewear, providing essential equipment for screening and refraction services. Lastly, national and provincial level advocacy efforts will be conducted.

In order to better design and implement this project, it is important to explore the knowledge, attitude and behavior of parents, students and teachers towards glasses use in SiB Project site in five districts in NTB Province. Domains of knowledge and attitude that need to be enhanced and factors affecting knowledge and attitude can be identified and addressed. Knowledge improvement through awareness campaigns will promote good attitudes and ultimately lead to the desirable positive change in behavior. With sufficient knowledge and positive attitude towards the use of glasses among school children and parents, acceptance and adherence of the use of glasses will be increased.

Objectives

The present study evaluated the level of knowledge, attitude and practice towards the use of glasses among students, parents and teachers in in NTB province. Specifically, this study aimed to achieve the following objectives:

1. Measure knowledge, attitude and practices of parents and students related to eye health and the use of glasses for refractive error.
2. Measure opportunity, capacity and motivation of parents to engage in general eye health.
3. Identify factors related to parent decisions about buying glasses for their children
4. Measure risky behavior leading to refractive errors in students.
5. Identify barriers and facilitators of the use of glasses in students.

CONCEPTUAL FRAMEWORK

The survey investigated knowledge, attitude and practices related to eye health and the use of glasses. It assumed a linear association between knowledge, attitude, and behavioral change, meaning that knowledge improvement through awareness campaigns will promote good attitude and ultimately lead to the desirable positive change in behavior¹³.

Knowledge

Knowledge is the acquisition, retention, and use of information or skills. Cognition through which knowledge is acquired is a process of understanding and is distinguished from the experience of feeling. Knowledge accrues from both education and experience. In this study, knowledge assesses the extent to which students and parents know about eye health, eye disorders and the benefit of glasses. This includes local knowledge and beliefs, knowledge of eye health and glasses, awareness of eye health and eye care services, awareness of risk to eye disorders etc.

Attitude

We defined attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour”. Attitude has three components: cognition, affect, and behaviour. Cognition comprises true and false beliefs about the attitude object; health education may change such beliefs. The attitude attribute characterizes an individual’s feelings, inclinations and indeed those of other household members with regards to glasses usage.

Practice

Practices demonstrates the acquisition of knowledge (increased understanding of a problem/disease) and any change in attitude caused by the removal of misconceptions about problems or disease that translates into preventive behaviors. In this study, practice refers to actions related to eye healthcare, access to eye healthcare, health seeking behavior related to eye complaints etc.

METHODS

Setting

The study was conducted in five purposively selected districts in West Nusa Tenggara Province i.e. Mataram City, West Lombok, Central Lombok, East Lombok and West Sumbawa District. In 2018, the total population of West Nusa Tenggara Province was 5,013,687 people. Almost half of the population had primary school education or lower. The majority of working population work in agricultural sector, followed by service and industry. The unemployment rate was 7.72%. In 2018, the minimum wage was IDR 1.9 million⁵.

Public healthcare is provided by a range of primary health center networks or referred to as Puskesmas, which is available in every subdistrict. There are 22 ophthalmologists in the province, with almost half of them are based in Mataram City. There is only 1 ophthalmologist in West and Central Lombok, 3 in East Lombok, while West Sumbawa does not have any ophthalmologist. Table 1 shows the characteristic of each study location.

Table 1 Characteristics of Study Location

Districts	No of population	No of Puskesmas	No of hospitals	No of ophthalmologist
Mataram City	477,476	11	16	12
West Lombok	685,161	19	1	1
Central Lombok	939,409	25	4	1
East Lombok	1,192,110	32	3	3
West Sumbawa	144,707	9	1	0

Study Design

Mixed-methods approach was used in this study. First, a school-based cross-sectional study was conducted to identify KAP of randomly selected students and their parents or caregivers. Visual acuity tests were also conducted to all students. Second, focus group discussions (FGDs) were conducted separately with parents or caregivers. Third, in-depth interviews (IDIs) were conducted with the physical education teachers in each school.

Sample

Sample of this study were as follows:

a. Cross-sectional study

- Students of primary and secondary schools (aged 6-15 years) were randomly selected to participate in the study. To achieve 95% confidence limit and 80% of power, the prevalence of refractive error of 28.3% among children² and urban-rural ratio of 1:1, it was determined that at least 312 randomly selected students needed to be recruited for the study. (<http://www.raosoft.com/samplesize.html>). Taking into account 15% of non-response, 358 students were recruited, rounded up to 360. Thus, 180 students were recruited each in urban and rural area. The inclusion criteria of students were as follows: 1) Age between 6-15 years, 2) Registered as students in the selected schools, 3) Present at the time of the data collection and 4) Have parental consent
- Parents of the selected students were subsequently recruited as sample. The inclusion criteria of parents were: 1) father or mother or caregivers of the selected students, 2) present at the time of the data collection, and 3) give consent to participate in the study.

b. Focus group discussions

FGD involved parents of children identified as having uncorrected and corrected refractive error. Two FGDs were conducted in each urban and rural area, with 8-10 parents per FGD group, making a total of 4 FGDs.

c. In-depth interviews

In-depth interviews were conducted with teachers responsible for school health (e.g. physical education teachers). In each participating school, one teacher was purposively selected and invited to the interview.

Sampling Method

a. Cross sectional study

Schools were classified into urban-rural and primary-secondary schools. Thus, there were 4 categories as follows: urban primary school, urban secondary school, rural primary school and rural secondary school. In each category, all schools in 5 districts including the number of students were listed. Using this list, we randomly selected 12 schools using simple random sampling (Table 2). In each category, 3

schools were randomly selected. From each selected school, 30 students were drawn from the list of students using random table.

Table 2 List of Selected Schools

No	Location	Name of school	Status	Number of students to be recruited	
				Grade 1-6	Grade 7-9
1	Mataram city	SD Negeri 51 Cakranegara	Urban primary school	45	-
2	Mataram city	SMP Negeri Mataram	Urban secondary school	-	15
3	West Lombok	SDN 1 Lembahsari	Urban primary school	30	-
4	West Lombok	SMP Negeri 5 Lembar	Rural primary school	-	24
5	Central Lombok	SD Negeri Pejeruk	Rural primary school	30	-
6	Central Lombok	SMPN 10 Praya Barat	Urban secondary school	-	24
7	East Lombok	SD Negeri Anjani	Urban primary school	45	-
8	East Lombok	SD Islam Dara Kunci	Rural primary school	30	-
9	East Lombok	SMP Islam Terpadu Hamzanwadi NW Peneda	Rural secondary school	-	30
10	East Lombok	SMP Negeri 1 Keruak	Rural secondary school	-	30
11	West Sumbawa	SD Negeri Rarak	Rural primary school	32	-
12	West Sumbawa	SMP Negeri 7 Taliwang	Rural secondary school	-	30
			Total	212	153

SD:primary school; SMP: junior high school

b. Focus Group Discussions

Parents whose children had corrected or uncorrected refractive errors were invited to participate in FGD. Identification of these children was facilitated by reports from teachers, reports from the local *Puskesmas*, and results from simple visual acuity test.

c. In-depth interviews

Physical education teachers or teachers responsible for school health of each participating schools were invited to participate in in-depth interviews.

Variables and Instrument

a. Socio-demographic variables

The first part of the parent questionnaire consisted the following socio-demographic variables:

- Age (in years)
- Sex categorized as male and female
- Highest level of education, categorized into 1) no education, 2) primary school (or lower), 3) junior high school, 4) senior high school, 5) diploma/bachelor or higher
- Type of employment, categorized according to the Central Bureau of Statistics categories.
- Income level, categorized as $I \leq \text{Rp } 2,000,000$, $\text{Rp } 2,000,001\text{-Rp } 5,000,000$ and $>\text{Rp } 5,000,000$
- Residential area categorized as urban and rural
- Disability status was measured by the Washington Group Short Set (WG-SS). It measures difficulties in functioning and consists of 6 questions on ability to perform daily activities with responses as: no difficulty, some difficulty, a lot of difficulty and cannot do at all. It produces the following four disability identifiers:
 - disability1: the level of inclusion is at least one domain/question is coded some difficulty or a lot of difficulty or cannot do at all.
 - disability2: the level of inclusion is at least 2 domains/questions are coded some difficulty or any 1 domain/question is coded a lot of difficulty or cannot do at all
 - disability3: the level of inclusion is any 1 domain/question is coded a lot of difficulty or cannot do at all.
 - disability4: the level of inclusion is any one domain is coded cannot do at all .
- Ownership of health insurance categorized as yes or no

b. Knowledge, attitude and practices of parents

Parent KAP questionnaire consisted of several modules i.e. 1) knowledge, 2) behavior, opportunity, capacity and motivation, 3) attitude and 4) practice modules. The behavior, opportunity, capacity and motivation modules were adapted from the same modules of Community Engagement in Eye Health Assessment Tool (CEEHAT) designed by The Fred Hollows Foundation Version 1. This is a tool to assess community opportunity, capacity and motivation to engage with eye health and care, and identification of areas for eye health service quality improvement. Scores of CEEHAT were calculated using the CEEHAT manuals. Each answer was assigned with specific scores (strongly disagree (1), disagree (2), agree (3), and strongly agree (4)). The scores then multiplied by 5 to give a score out of

20. For some negative items, we performed reverse scoring. A score of 4 was for strongly disagree and 1 was for strongly agree. We also adopted some of the questions on knowledge, attitude, and practice to local context using previous literature while keeping original intent. A back translation (from Indonesian back to English) was conducted before implementation.

c. Knowledge, attitude and practices of students

Student questionnaire consisted of demographic, knowledge, attitude, and practice modules. Demographic information included date of birth, sex, grade (grade 1-4 and grade 5 and higher), level of school (primary and secondary) and whether they wear glasses or not. Questions on KAP were taken from previous literature. We had two sets of questionnaires i.e. for grade 1-4 and grade 5 and higher. There was slight difference between the two questionnaire in terms of language and type of questions.

d. Visual acuity test

Simple visual acuity tests were conducted with students in order to identify students with visual problems, so that correlation with KAP could be drawn. It was also important to identify those with visual problems so that their parents could be invited to FGDs. Researchers were trained by local ophthalmologist as part of project orientation and training workshops. Visual acuity test was conducted using the “Tumbling E” chart. This chart is suitable for young children who are unable to read. The “Tumbling E” eye chart uses a capital letter E that faces in different directions. The student was asked to stand 6 metres from the examiner. Any glasses or contact lenses should be removed. Student was asked to cover one eye. The trained research examiner asks the student being tested to use their fingers to show the direction in which the “fingers” of the E are pointing⁶. The results were classified into the following categories: 1) no visual problem, when visual acuity of both eyes was 6/6, 2) visual problem in one eye, when visual acuity in one of the eyes was worse than 6/6 and 3) visual problem in both eyes, when visual acuity in both eyes was worse than 6/6.

d. Qualitative Study

The qualitative arms of this study explored the perceptions, knowledge, attitude, beliefs, and practices of parents and teachers regarding the use of glasses and eye health. Interviews and FGDs were conducted using a pre-determined topic guide (Appendix 1). Knowledge on eye health, common eye problems in children, seeking care behaviour for eye problems in children, access and barriers to

available eye care services, attitude towards eye care service and glasses, health education on eye health and sources of information were explored during FGDs and IDIs.

All instruments were first developed in English, translated into Indonesian and then back translated to English by bilingual translator. The Indonesian version of the student instrument was tested to five students (three grade 1-4 students, two grade 5 and higher students) to check their understanding to the questions. The parent The Indonesian version of the instrument was also tested to their parents.

Data Collection Procedure

Schools were first visited by enumerator. School principals were approached to obtain their permission. If the school agreed to participate in the survey, they would be asked to provide the students list for the enumerator to select randomized samples. Enumerator would visit the student's house to meet the parents and ask for their consent to participate in the survey. They would also be asked to give consents for participation in the study for their children. Consenting parents would be asked to participate in the survey. The next day, the selected students who had obtained parental consent would be invited to participate in the survey. They would be summoned from their classrooms to a separate room to be interviewed and tested for visual acuity.

Both parent and child questionnaires were administered in face-to-face interviews by trained interviewers using Open Data Kit (ODK) based questionnaire on mobile phone. Parent and child questionnaire took about 20 and 40 minutes respectively to be completed by enumerator.

FGDs were conducted at schools, involving parents of children with corrected or refractive error. Schools were asked to facilitate the process by sending invitations to eligible parents.

In depth-interviews were conducted separately with teachers. Physical education teachers at the selected schools were verbally invited to the interview.

Ethical Considerations

The study was approved by the Ethical Committee of Faculty of Medicine University of Mataram. Written informed consents were obtained from all respondents. Consent for students were obtained from their

parents. After students were selected, their parents were contacted to participate in the study and give consents for the children.

No identifying information were recorded during the questionnaire and qualitative interviews. All confidential data (including consent forms and completed questionnaires) have been stored securely in locked filing cabinets or password-protected computers accessible only to authorised personnel.

Data Management

Survey data were collected by trained enumerator managed by one field coordinator. Interview data were documented in Open Data Kit (ODK)-based digital questionnaire form on mobile devices. The data collection application is available offline which allows the storage of information before sending to the Cloud. Data were entered by enumerators immediately during interviews. After the enumerator has completed asking all questions, the enumerator rechecked the answers one more time before pushing the saving or submission button in the data in the data collection application. Subsequently, the field coordinator ensured that the digital form has been completed accurately and no missing answers before transferring it to the cloud. Data were sent to the Cloud as soon as an internet connection was established. Data were automatically transferred from the digital apps to a web-based dataset located in the main study site. Data manager exported the data from the web and stored in computer which is protected and performed daily backup to prevent if there are some error in web-based dataset. Data cleaning was conducted during surveys to find out if there are discrepancies of the data. The data were verified for its completeness, consistency, and discrete value checks. Any discrepancies was sent via email to the field coordinator who forwarded it to the enumerators to verify.

Qualitative data were collected by researchers. All audio records were transcribed verbatim by bilingual transcriber (Indonesian and Sasak).

Data Analysis

Descriptive statistics were used to explore the data; frequency and percentages were used to describe categorical variables, while means were used to describe continuous variables. In the bi- and multivariate statistics, we collapsed several categories into two or three categories i.e. educational level was categorized as primary school or lower and junior high school or higher; income level was categorized as

≤ Rp 2,000,000 and > Rp 2,000,000; disability status was categorized as no disability, disability grade 1 and 2, and disability grade 3 and 4.

The significance of differences between variables was assessed using the t-tests or two-way ANOVA for continuous variables and the Chi-squared test for dichotomous variables. Multiple linear regression models with separate models for each CEEHAT scores were constructed used to study the influence of different variables on CEEHAT scores. Age, gender, educational level, income level, residential area, disability and ownership of health insurance were included as independent variables.

The statistical significance was set at p-value ≤ 0.05. Descriptive, bivariate and multivariate analyses were performed with 95% confidence interval. Quantitative data were converted from ODK into Excel and analyzed by SPSS version 23.0.

For qualitative data analysis, all interviews were transcribed verbatim and thematic data analysis was performed in Indonesian language. A percentage of the qualitative data was translated into English and analysed by FHF research advisor. Principal investigator and research advisor conducted two meetings to review & confirm categorisation and themes. Thematic analysis was used identify the main themes.

RESULTS

Characteristics of Respondents

Parent KAP Survey

A total of 366 parents were recruited from 5 districts in West Nusa Tenggara Province with the following distribution: 50 parents in Kota Mataram (16.4%), 54 in West Lombok (14.8%), 54 in Central Lombok (14.8%), 135 in East Lombok (36.9%) and 63 in West Sumbawa (17.2%). Half of the parents lived in urban and half in rural areas.

The majority of the parents were female (82.0%), perhaps because most respondents were the mother of the student. Age of the parents were mostly between 30-39 years old (41.3%) and 40-49 years old (32.2%). Most parents (79.8%) had low educational background: 37.7% completed only primary school, 18.3%

completed junior high school, 15.3% completed senior high school and 23.8% never went or completed school. Parents mostly had two or three children (35.5% and 28.4%, respectively) (Table 3).

About 75.7% of parents had monthly income below Rp 2,000,000. Almost one third of the respondents were housewives or working in the agricultural sector. Most parents had insurance (70.8%), with the national health insurance or BPJS as the most common type of insurance (99.6%). Table 1 shows some of the respondents' characteristics.

In terms of decision making related to health, almost half of the respondents identified mothers as decision makers on health issues in the household. For eye health, mothers were also the decision maker identified by half of the respondents. Fathers were identified as decision makers by 35.5% parents, both for general health and eye health issues.

Table 3 Characteristics of Parent Respondents

Parameter		Frequency	Percent
Gender	Male	66	18.0
	Female	300	82.0
Relationship with children	Father	61	16.7
	Mother	270	73.8
	Caregiver	35	9.6
Education	No school	87	23.8
	Primary school	138	37.7
	Junior high school	67	18.3
	Senior high school	56	15.3
	Bachelor or higher	18	4.9
Income level	Unemployed	5	1.4
	<1.000.000	132	36.1
	1.000.000-2.000.000	140	38.3
	2.000.001-5.000.000	70	19.1
	>5.000.000	19	5.2
Occupation	Housewives	103	28.1
	Farmer / farming labor	105	21.0
	Merchant	63	38.2
	Employees	38	10.4
	Laborer	24	6.6
	Others	103	28.1

Based on the Washington Short Set questions, the number and percentage of parents according to their disability level is illustrated in below table. Sixty percent of parents did not have any disability. Almost 20% had disabilities grade 1 and 14% had disabilities grade 2. Less than 10% of parents had disabilities grade 3 or 4 (Table 4).

Table 4 Level of Disability in Parents

Level of Disability	Frequency	Percent
No disability	216	59.0
Disability 1	68	18.6
Disability 2	51	13.9
Disability 3	29	7.9
Disability 4	2	0.5

Students in KAP Survey

A total of 373 students participated in the survey, all of whom obtained parental or caregiver consents. There were more students than parents interviewed because a number of parent interviews were dropped. The mean age of students were 10.9 years, with the youngest aged 5.9 years and the oldest aged 19.3 years. Half of the students were female (Table 5).

Table 5 Characteristics of Students

Parameter		Frequency	Percent
Gender	Male	186	49.9
	Female	187	50.1
Type of School	Urban primary school	90	24.1
	Rural primary school	127	34.0
	Urban secondary school	96	25.7
	Rural secondary school	60	16.1

Parents in Focus Group Discussions

A total of 4 FGDs in 4 schools (2 in urban, 2 in rural areas) were conducted involving a total of 40 respondents. Their characteristics are shown in Table 6. Out of the total respondents, 25 were female and 17 had primary school education. Fourteen respondents had junior high school education, while eight had senior high school education. Age ranged from 23 to 54 years old.

Table 6 Characteristics of Focus Group Discussion Respondents

FGD	Location	No of participants		Age range, years (min-max)	No with > primary school education
		Female	Male		
1	Urban primary school	8	4	27-54	10
2	Rural primary school	6	4	30-50	0
3	Urban secondary school	8	0	23-45	5
4	Rural secondary school	3	7	24-45	7
	Total	25	15	23-54	22

Teacher Respondents in IDIs

A total of 12 teachers were interviewed from all schools. Most teachers interviewed were male, only one teacher was female. Age ranged from 22 to 55 years. The majority were physical education teacher with a Bachelor degree education. One secondary school teacher had only high school education. Only 4 teachers had permanent position as civil servant teachers, while the rest were contract-based teachers. The duration of work experience ranged from 4 months to 33 years.

Knowledge of Parents on Eye Health

The majority of parents (90.7%) perceived that their child had normal vision. Very few perceived that their child did not have a normal vision, and the rest were not sure about their child's eye condition. When asked about the causes of low vision, about a quarter of parents did not know the cause of low vision. Most parents (67.8%) mentioned that the frequent or prolonged screen time from gadgets or television can cause low vision. Some other causes mentioned were bad reading habit i.e. low light, inadequate distance, reading position (23.2%); poor nutrition especially vitamin A (11.5%); exposure to dust (6.8%), and genetic or hereditary (4.6%).

About 35.8% parents said they did not know the signs of low vision. Low vision was associated with blurry vision (32.5%), redness of the eyes (29.0%), and pain or discomfort around the eye (28.1%). Some other signs mentioned were eye squinting (13.1%), headache (13.9%) and watery eye (21.9%).

When asked about the treatment of low vision, a quarter of parents said they do not know how to treat low vision. Half of the parents (47.8%) mentioned that medicine (oral, topical) can treat low vision, while

another 15% suggested to go to doctor. Around 18% parents mentioned that traditional medicine can treat low vision. Less than 20% parents mentioned the use of glasses.

About 15% parents did not know the reason of people wearing glasses. Most parents (75.1%) mentioned that glasses can improve vision or help people to see more clearly. Other mentioned that glasses can protect eyes from sunrays or radiation or dust (12.8%), while the rest (5.7%) said that glasses are used as a fashion or to look smart.

When asked about the frequency of eye examination for children, the majority of parents (41.8%) mentioned that eye examination should be done more than once a year (i.e. every two weeks, every month, every two months, etc). About 94 parents (25.7%) said they do not know, 78 parents (21.3%) said to have examination when there is complain, and only 37 (10.1%) parents said examination needs to be done every 1-2 years.

When asked about when a child can get eye examination for the first time, 101 parents (27.6%) said they do not know. Only 78 parents (21.3%) answer correctly: below the age of 3 years old. Other answers mentioned were: during preschool (59; 16.1%), primary school (76; 20.8%), when there is complain (29; 7.9%), and others (23; 6.3%).

Most parents knew where to get eye examination for their children. Parents reported that they can get eye examination for children at Puskesmas (35.2%), or ophthalmologist (30.1%). Others reported that they can get eye examination at general practitioner (22; 6.0%), hospital (56; 15.3%), and optician (11; 3.0%). Only few parents did not know where they can get eye examination for children (4.9%).

A third of parents did not know where to buy or obtain glasses. Half of the parents mentioned that they can get glasses from optic shop (52.2%), while other reported that they can get glasses at hospitals (6.8%). Very few parents knew that they can obtain glasses at public health center.

The majority of parents (79.5%) mentioned they never received information regarding eye health. Only 75 parents (20.5%) said they have heard information about eye health. Of these, 31 parents (41.3%) mentioned that they got information from a healthcare provider such as doctors or nurse, other 22

parents (29.3%) mentioned television or radio, and 20 parents (26.7%) said they got information from families or friends.

Attitude of Parents towards Glasses

We asked about the parent's views and attitude towards the use of glasses (Table 7). Overall, more than half of parents had favorable perception towards glasses. Many parents agreed that glasses can make someone look better (58.5%) and that glasses can increase confidence (60.4%). Most parents disagreed with the statement that wearing glasses make someone look unattractive to the opposite sex (79.0%). When given statement that glasses can make someone looks smart, parents were quite balanced between the disagree (52.0%) and agree group (48.0%).

Most parents disagreed that wearing glasses is uncomfortable (62.9%), and that wearing glasses can cause activity limitation (57.9%). The majority of parents (85.0%) disagreed with the statement that wearing glasses can worsen someone's vision. When given statement that wearing glasses can cause dependence, parents were divided almost equally between agree and disagree group (52.2% and 48.8%; respectively).

When asked about the use of glasses in younger population, most parents disagreed with the statement that young people do not need glasses to improve their eyesight (72.7%). Sixty percent of parents also disagree that poor vision does not influence the quality of life. Most agreed that those who are prescribed glasses must use glasses regularly (69.4%).

However, when being asked about the price of glasses, the majority of parents (71.9%) perceived that glasses are expensive. When asked whether eye examination takes time, the parents were equally divided into the group who agree with the statement (49.7%) and those who do not (50.2%).

Table 7 Attitude of Parents towards Glasses

Statement	Frequency (percent)			
	Strongly disagree	Disagree	Agree	Strongly agree
Glasses makes you look better	4 (1.1)	148 (40.4)	206 (56.3)	8 (2.2)
Wearing glasses increases your confidence	6 (1.6)	139 (38.0)	212 (57.9)	9 (2.5)
Wearing glasses makes it unattractive to opposite sex	16 (4.4)	273 (74.6)	76 (20.8)	1 (0.3)
Glasses makes you look smart	9 (2.5)	181 (49.5%)	165 (45.1%)	11 (3.0%)
Wearing glasses is uncomfortable	1 (0.3)	229 (62.6%)	132 (36.1%)	4 (1.1%)
Wearing glasses can cause activity limitations	6 (1.6)	206 (56.3%)	148 (40.4%)	6 (1.6%)
Wearing glasses creates dependence	5 (1.4)	170 (46.4%)	186 (50.8%)	5 (1.4%)
Wearing glasses worsen your sights	23 (6.3%)	288 (78.7%)	51 (13.9%)	4 (1.1%)
Young people do not need glasses to improve eyesight	12 (3.3%)	254 (69.4%)	94 (25.7%)	6 (1.6%)
People who wear glasses have to wear it regularly	1 (0.3%)	86 (23.5%)	254 (69.4%)	25 (6.8%)
Poor vision does not influence quality of life	10 (2.7%)	213 (58.2%)	137 (37.4%)	6 (1.6%)
Glasses are expensive	4 (1.1%)	99 (27.0%)	229 (62.6%)	34 (9.3%)
Eye examination takes time	2 (0.5%)	182 (49.7%)	175 (47.8%)	7 (1.9%)

Parental characteristics were associated with some of the attitude towards glasses. There were significantly more parents with low education and parents in rural areas who agreed that glasses will make people look smart (p-value<0.00 and p-value=0.016, respectively) and improve confidence (p-value=0.008 and p-value=0.034, respectively). Parents with lower education also believed that glasses will improve appearance (p-value=0.003). Perception that glasses are expensive was also significantly related with parental education and parental income (p-value=0.026 and p-value<0.00, respectively).

Opportunity, Capacity and Motivation (CEEH)

Understanding of eye healthcare

Table 8 shows the scores for understanding eye healthcare domain. Most parents knew where to go when they need eye check-up, but only half of the parents knew how much it costs them to get an eye check-up. Most also reported that they know how frequent they need to get their eyes checked. More than 90% parents also knew where to find a trustworthy source for information on health problems.

Table 8 Frequency Distribution on Understanding of Eye Healthcare

Parameter (score)	Frequency	Percent
I know where to go if I need an eye check-up		
Strongly disagree (1)	0	0
Disagree (2)	23	6.3
Agree (3)	305	83.3
Strongly agree (4)	38	10.4
I know how much it will cost me to get an eye check-up		
Strongly disagree (1)	4	1.1
Disagree (2)	189	51.6
Agree (3)	159	43.4
Strongly agree (4)	14	3.8
I know where to find trust-worthy information about health problems		
Strongly disagree (1)	0	0
Disagree (2)	10	2.7
Agree (3)	314	85.8
Strongly agree (4)	42	11.5
I know how often I should get my eyes checked		
Strongly disagree (1)	1	0.3
Disagree (2)	88	24
Agree (3)	262	71.6
Strongly agree (4)	15	4.1

Overall, the mean score for CEEHAT understanding was 11.42 (95% CI 11.30-11.54). Univariate analysis showed that CEEHAT understanding was significantly correlated with age, in which the older the age of the parents, the lower was the CEEHAT understanding score ($p\text{-value}<0.00$). There was no significant difference in score between genders. Between levels of disabilities, there was no significant difference in score of CEEHAT understanding. Parents who lived in rural areas had slightly higher score than those who lived in urban areas ($p\text{-value}=0.049$). There was a significant difference in CEEHAT understanding between parents with primary school education or lower and higher than primary school education ($p\text{-values}<0.00$). Parents with income level below Rp 2,000,000 had significantly lower score than parents with income level of higher than Rp 2,000,000 ($p\text{-value}<0.000$).

Motivation to engage in eye healthcare

In terms of motivation to engage in eye healthcare, 30% respondents put low priority to eye-check, as they felt that they have many more important things to do than get an eye check. Sixty percent respondents disagreed that there are many more important things to do than get an eye check, indicating that they would prioritize getting an eye check. Few respondents agreed with the statement that they would go blind when they get old, however, most respondents agreed that difficulty in seeing would be a big problem for them and protecting sight is very important. However, 30% respondents perceived that wearing glasses is embarrassing or unattractive (Table 9).

Table 9 Frequency Distribution on Motivation to Engage in Eye Healthcare

Parameter (score)	Frequency	Percentage
(R) I have many more important things to do than get an eye check		
Strongly disagree (4)	17	4,6
Disagree (3)	221	60,4
Agree (2)	115	31,4
Strongly agree (1)	13	3,6
(R) I expect to go blind when I get old		
Strongly disagree (4)	57	15,6
Disagree (3)	249	68
Agree (2)	56	15,3
Strongly agree (1)	4	1,1
Difficulty seeing would be a big problem for me		
Strongly disagree (1)	3	0,8
Disagree (2)	66	18
Agree (3)	243	66,4
Strongly agree (4)	54	14,8
You should do everything you can to protect your sight		
Strongly disagree (1)		
Disagree (2)	4	1,1
Agree (3)	296	80,9
Strongly agree (4)	66	18
(R) Wearing glasses is embarrassing or unattractive		
Strongly disagree (4)	11	3
Disagree (3)	237	64,8
Agree (2)	110	30,1
Strongly agree (1)	8	2,2

The mean score for CEEHAT motivation was 11.45 (95% CI 14.3-14.6). CEEHAT motivation was significantly correlated with age, in which the older the age of the parents, the lower was the CEEHAT motivation score (p -value<0.001). No difference in score between genders and between residential areas was found. There was a significant difference in CEEHAT understanding in terms of parents' education level. Parents with lower education level had worse score than parents with higher education level (p -value<0.001). Score of parents with income level below Rp 2,000,000 was also significantly lower than parents with income level of higher than Rp 2,000,000 (p -value<0.000). Parents whose children were in primary school had higher motivation score than those whose children were in secondary school. Between levels of disabilities, there was strongly significant difference in score of CEEHAT motivation (p -value<0.01).

Trust in healthcare

Overall, the trust in healthcare among parents was moderate. The majority of parents had trust in modern medicine and treatment for eye health. However, only half of respondents believed that modern surgery for eye disease is effective. There were around 40% parents who would first go to traditional healer or use home remedies. Most expressed trust that the local eye health services were able to provide high quality care and to treat patients respectfully (Table 10).

Table 10 Frequency Distribution on Trust in Healthcare

Questions	Frequency	Percentage
I trust modern medicines and treatment for my eye health		
Strongly disagree (1)	0	0
Disagree (2)	6	1.6
Agree (3)	277	75.7
Strongly agree (4)	83	22.7
Modern surgery for eye disease is effective		
Strongly disagree (1)	6	1.6
Disagree (2)	150	41
Agree (3)	187	51.1
Strongly agree (4)	23	6.3
(R) If I had an eye problem I would first go to a traditional healer or use home remedies		
Strongly disagree (4)	21	5,7
Disagree (3)	202	55,2
Agree (2)	135	36,9
Strongly agree (1)	8	2,2

Questions	Frequency	Percentage
I trust my local eye service to provide high quality care		
Strongly disagree (1)	0	0
Disagree (2)	22	6
Agree (3)	291	79.5
Strongly agree (4)	53	14.5
I trust my local eye service to treat me respectfully		
Strongly disagree (1)	0	0
Disagree (2)	9	2.5
Agree (3)	315	86.1
Strongly agree (4)	42	11.5

The mean score for CEEHAT trust in healthcare was 14.6 (95% CI 14.5-14.8). Age, gender, level of education, type of school and disability level were not correlated with CEEHAT trust in healthcare. There was a significant difference in CEEHAT trust in healthcare by income level. Parents who lived in rural areas had significantly higher score than those who lived in urban areas (p-value=0.032). Parents with income level of Rp 2,000,000 or lower had significantly lower score than parents with income level of higher than Rp 2,000,000 (p-value=0.033).

Opportunity to engage with eye healthcare

Opportunity to engage with eye healthcare was generated from the questions below (Table 11). Overall, opportunity to engage with eye healthcare was quite high. Around 65% reported difficulties in paying for an eye check-up, although 70% reported that they would have no difficulty traveling to get an eye check-up. Eighty percent also would have no difficulty to find someone to accompany to get an eye check-up, however, around 20% would have difficulties taking time off from other daily responsibilities. The majority stated that they would have no difficulty getting permission from family to attend an eye check-up.

Table 11 Frequency Distribution on Opportunity to Engage with Eye Healthcare

Questions	Frequency	Percentage
Would you have difficulty paying for an eye check-up, if you needed one		
Cannot do at all (1)	10	2.7
Yes - a lot of difficulty (2)	82	22.4
Yes - some difficulty (3)	151	41.3
No - no difficulty (4)	123	33.6
Would you have difficulty travelling to get an eye check-up, if you needed one		
Cannot do at all (1)	0	0
Yes - a lot of difficulty (2)	27	7.4
Yes - some difficulty (3)	74	20.2
No - no difficulty (4)	265	72.4
Would you have difficulty finding someone to accompany you to an eye check-up, if you needed one		
Cannot do at all (1)	2	0.5
Yes - a lot of difficulty (2)	15	4.1
Yes - some difficulty (3)	60	16.4
No - no difficulty (4)	289	79
Would you have difficulty taking time off from daily chores, employment or caregiving responsibilities to get an eye check-up, if you needed one		
Cannot do at all (1)	0	0
Yes - a lot of difficulty (2)	11	3
Yes - some difficulty (3)	79	21.6
No - no difficulty (4)	276	75.4
Would you have difficulty getting permission from your family to attend an eye check-up, if you needed one		
Cannot do at all (1)	0	0
Yes - a lot of difficulty (2)	2	0.5
Yes - some difficulty (3)	18	4.9
No - no difficulty (4)	346	94.5

The mean score for CEEHAT opportunity was 18.1 (95% CI 14.5-14.8). Older age was significantly negatively correlated with CEEHAT opportunity score (p -value=0.16), which means that younger parents had significantly higher score. There was no difference in score between genders. There was significant difference in CEEHAT opportunity by education. Parents with primary school education or lower had significantly lower score than those with junior high school education or higher (p -value <0.000). Those with income level of Rp 2,000,000 or lower had significantly lower score than parents with income level

of higher than Rp 2,000,000 (p-value<0.000). Between levels of disabilities, there was strongly significant difference in score of CEEHAT opportunity (p-value<0.001).

Practice of Parents

History of Engagement with Eye Healthcare

Below table shows the history of engagement with eye healthcare measured by CEEHAT. Most parents never had any history of having eye check, eye surgery, purchase of glasses and use of glasses.

Table 12 History of Engagement with Eye Healthcare

Items	Yes	No
Have you had an eye check in the past 2 years?	45 (12.3)	321 (87.7)
Have you ever had eye surgery?	3 (0.8)	363 (99.2)
Have you ever purchased glasses?	55 (15.0)	311 (85.0)
Do you wear glasses regularly?	55 (15.0)	311 (85.0)

When score for CEEHAT history of engagement was computed, the mean score was 0.4 (95% CI 0.28-0.45). This low mean score suggested that community members have no recent or significant experience engaging with eye healthcare. The history of eye examination was significantly associated with education level of parents. Proportion of parents with junior high school education or higher who had eye-check in the last 2 years was significantly higher than those of parents with primary school education or lower (p-value=0.029).

A total of 325 parents (88.8%) never had any eye examination at any time. Of the 11.2% who ever had eye examination, 41.5% had examination at ophthalmologist at clinic or hospital, and 26.8% had examination at optics. Sixty percent of parents who had eye examination paid with out-of-pocket money, while the rest paid with national health insurance. Only 9% of the total parents have ever been prescribed glasses. However, 50 parents reported that they wear glasses the percentage of parents reporting having glasses was higher, suggesting that some respondents obtained glasses without prescription. Of those reported having glasses, most obtained the glasses from optics (60.8%) and street vendors (23.5%). The majority of respondents pay from their own pocket for the examination (61.0%) and only 26.8% use the national health insurance.

Practice of Eye Healthcare for Children

Of the total parents, only 33 parents (9%) ever had eyes examination for their child. The majority of the eye examination was done within the last two years (75.8%). Only 2 children have ever been prescribed glasses, 1 from an ophthalmologist, and 1 from an optician. One parent did not buy the glasses though because of the price. Twenty three parents reported that their children ever complained some eye problems. Of these, 13 parents (56.5%) did not get it examined. Five parents (21.7%) brought their children to Puskesmas, 3 (13.0%) to general practitioner and 2 (8.7%) to ophthalmologist.

Risky Behavior among Children as Reported by Parents

Seventy percent of parents reported that their children watch television every day, with the mean duration of 2.05 hours (95% CI 1.86-2.24). Around 55% parents reported that their children used mobile phone/tab/laptop or video games with the mean duration of 2.77 hours (95% CI 2.20-3.33).

Factors influencing CEEHAT Scores and Practice of Parents

Multiple linear regression analyses showed that CEEHAT understanding in parents was significantly associated with age, education level, income level, and residential area. Older age of parents was significantly associated with lower CEEHAT understanding score. Higher level of education and higher income were associated with higher CEEHAT understanding score. Rural residential area was associated with higher CEEHAT understanding score.

CEEHAT motivation was significantly associated with education level, income level, disability and insurance ownership. Higher education and income level was significantly associated with higher score on CEEHAT motivation. Higher disability level was significantly associated with lower score on CEEHAT motivation. Having insurance was also associated with having higher score on CEEHAT motivation.

CEEHAT trust in eye healthcare was significantly associated with residential area and ownership of health insurance. Parents who lived in rural areas had higher trust to local eye healthcare. Those with health insurance had higher trust to local eye healthcare.

Education level, income level, and disability were significantly associated with CEEHAT opportunity. Parents with higher education level had higher CEEHAT opportunity score. Higher income level was

strongly associated with higher CEEHAT opportunity score. Those with higher disability level had worse CEEHAT opportunity score.

Table 13 shows the results of multiple regression analysis on CEEHAT score.

Table 13 Multiple Linear Regression Analysis on CEEHAT Scores

	CEEH-und	CEEH-mot	CEEH-trust	CEEH-op
Constant	11.899	14.418	14.256	18.690
Age	-0.17**	-0.01	0.002	-0.02
Sex	-0.64	0.28	-0.2	-0.08
Education level	0.12*	0.38*	0.02	0.15*
Income level	0.19**	0.42*	0.07	0.17**
Residential area	0.12*	-0.13	0.12*	-0.06
Disability	0.07	-0.27*	-0.08	-0.38**
Insurance	0.02	0.34*	0.13*	-0.05
F-statistics	6.406	5.879	2.65	19.9
Adjusted R-square	0.09	0.09	0.03	0.26
Degrees of freedom	7	7	7	7

CEEH-und: CEEHAT understanding; CEEHAT mot: CEEHAT motivation; CEEHAT op: CEEHAT opportunity

*p-value<0.05

**p-value<0.001

Knowledge of Students on Eye Health

Most students reported that they knew a person wearing glasses. When being asked about the causes of low vision, 35.4% answered that they did not know. There was no significant difference in the proportion of students who did not know the cause the low vision between male vs female, urban vs rural and primary vs secondary school. However, there was a significant difference in the proportion of students who did not know the cause the low vision between students of grade 1-4 and students of grade 5 and higher (p-value=0.013). The proportion of students who did not know the cause of low vision was higher among lower grade students. Of those who knew the causes of low vision, 31.4% students reported that low vision might be caused by excessive screen use. Less than 10% reported that bad reading habit might cause low vision.

Almost half of the students reported that they did not know the signs of low vision. The proportion of students who reported that they know the signs of low vision were significantly higher among students in secondary school, urban area schools and students of higher grades.

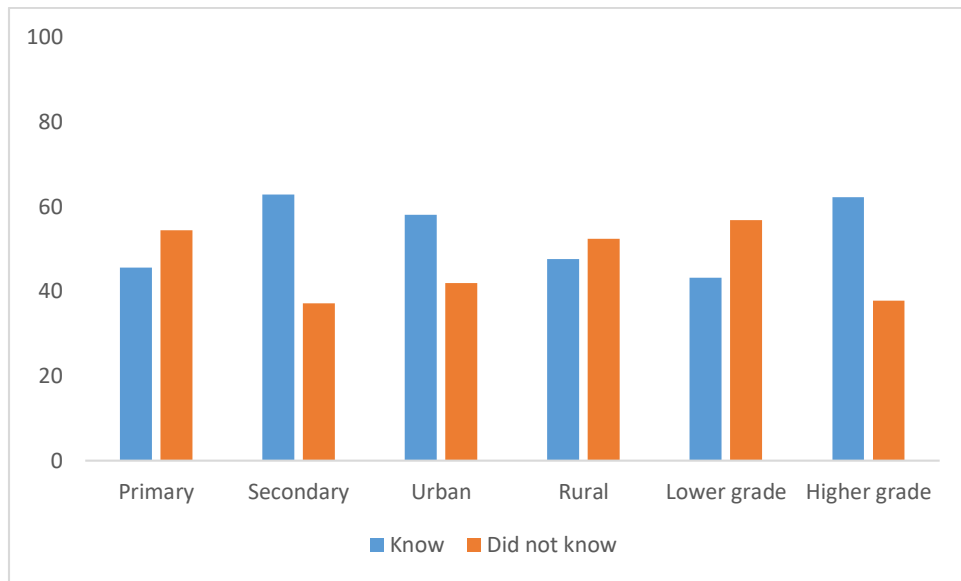


Figure 1 Proportion of Students Reported Having Knowledge on Signs of Low Vision

Around one third (35.4%) of students did not know how to treat low vision. One third of students (32.4%) mentioned that low vision can be treated by wearing glasses and 17% mentioned by medicine. There was significant difference in the proportion of students who knew the treatment of low vision between primary and secondary school, urban and rural school and lower and higher grade (Figure 2).

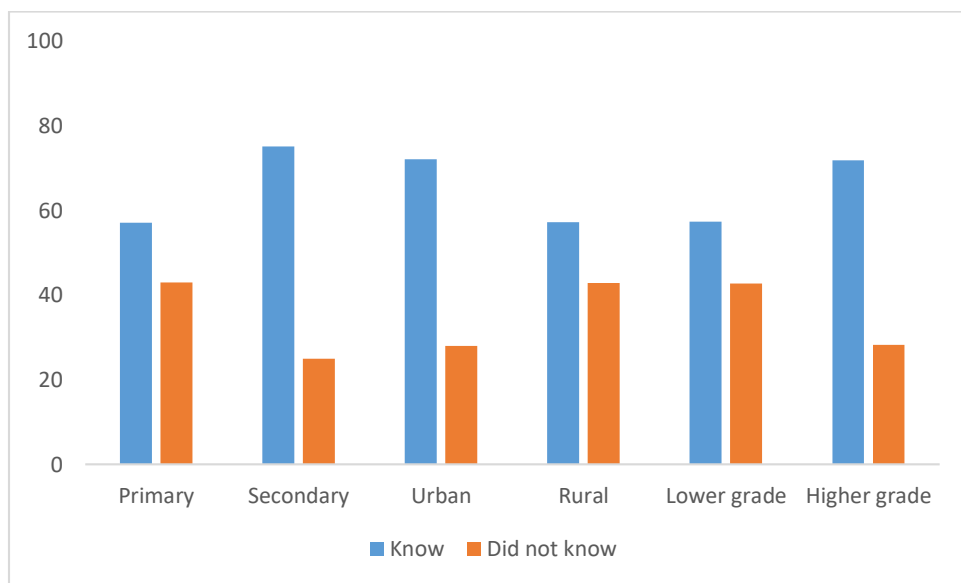


Figure 2 Proportion of Students Reported Having Knowledge on Treatment of Low Vision

To prevent low vision, one third of students suggested to reduce screen exposure. When asked about the purpose of wearing glasses, half of students mentioned that people wear glasses in order to see things more clearly.

To get an eye check for eye problems, 42.6% students suggested Puskesmas and 32.2% ophthalmologist. Around 14% of students however did not know where to go to get an eye check. Moreover, 40% of students did not know where to get glasses. One third of students mentioned that glasses can be obtained at optics. Very few students mentioned health facilities such as Puskesmas or hospitals. Of all students, only 108 (30%) ever obtained information on eye health. One third obtained information on eye health from teachers, one third from health workers and the rest was from family/friends and media such as television and radio.

There was no significant difference in the knowledge of students between different parent characteristics such as parental education and parental income.

Attitude of Students towards Eye Health and Glasses

Overall, students showed positive attitude towards eye health. Almost all students agreed that eye health is very important. The majority would also report to their parents when they experience eye problems.

The attitude of students towards the use of glasses was moderately positive. Around 65% students perceived that people who wear glasses look smart. However, one quarter of students thought that wearing glasses look ugly, while in contrast, 70% respondents thought that wearing glasses makes people look handsome/beautiful. About one third of students would feel embarrassed if they have to wear glasses, and around 20% thought that their vision would get worsened with glasses. Around a third of students also thought that wearing glasses would also be uncomfortable and limiting activities. Forty percent of students agreed that those who wear glasses do not take care of their eyes. However, most agreed that glasses must be worn regularly.

Table 14 Attitude of Students towards Eye Health and Glasses

Parameter	N (%)			
	Strongly disagree	Disagree	Agree	Strongly agree
When I have an eye problem, I will tell my parents	2 (0.5)	11 (2.9)	263 (70.5)	97 (26.0)
I think eye health is very important	1 (0.3)	9 (2.4)	239 (64.1)	124 (33.2)
People who wear glasses look smart	9 (2.4)	124 (33.2)	209 (56.0)	31 (8.3)
People who wear glasses look ugly	23 (6.2)	249 (66.8)	88 (23.6)	13 (3.5)
Glasses make people look handsome/beautiful	4 (1.1)	109 (29.2)	231 (61.9)	29 (7.8)
I would feel embarrassed if I have to wear glasses	11 (2.9)	213 (57.1)	131 (35.1)	18 (4.8)
My vision would get worsened with glasses	30 (8.0)	264 (70.8)	74 (19.8)	5 (1.3)
Wearing glasses is not comfortable	13 (3.5)	213 (57.1)	135 (36.2)	12 (3.2)
Wearing glasses restricts me in doing activities	17 (4.6)	210 (56.3)	130 (34.9)	16 (4.3)
Young people do not need to wear glasses to correct their vision	13 (3.5)	230 (61.7)	123 (33.0)	7 (1.9)
People who wear glasses do not take care of their Eyes	12 (3.2)	201 (53.9)	145 (38.9)	4.0 (4.0)
Those who wear glasses must wear it regularly	0	29 (7.8)	289 (77.5)	55 (14.7)

There was no significant difference in the attitude between sexes. Also, between students in primary vs secondary school, urban vs rural schools and lower vs higher grades, there was no significant difference in the attitude. There was no significant difference in the attitude of students between those with low vs highly educated parents and between those whose parents had income \leq Rp 2,000,000 and 2,000,000 or higher.

Practice of Eye Health in Students

A total of 25.7% of students reported that they underwent an eye examination in the last 2 years. The location of eye examination were mostly at school (Figure 1). Sixty students (16.1%) reported that they had difficulties to see something and to read. However, only 9 students ever wore glasses and only 10 students were ever told by health workers to wear glasses.

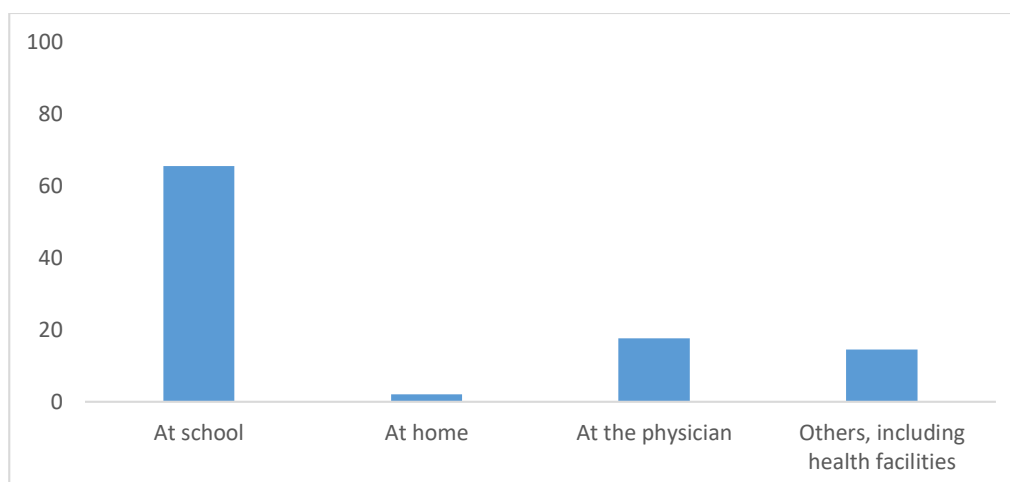


Figure 3 Places of Eye Examination of Students in the Last 2 Years

Risky Behavior among Students

Almost half of students used gadget such as mobile phone or tab or laptop or video games. The mean duration of using gadget was 2.15 hours (95% CI 1.95-2.35) per day. Seventy percent of students also reported that they watch television every day, with the mean duration of 2.6 hours (95% CI 2.14-3.06) per day. There was no difference in the mean duration of watching television or using gadget between different student characteristics. However, students whose parents had lower education level had significantly higher mean of watching television than those whose parents had higher education level (p-value=0.026).

Visual Acuity Test in Students

The following table shows the results of visual acuity test on left eye and right eye in students. The majority of students had a visual acuity of 6/6 or normal vision in right eye and left eye. The percentage of students with visual acuity of 6/9 was 6.7% and 7.8% in right and left eye, respectively.

Table 15 Results of Visual Acuity Test in Students

Results	Right eye	Left eye
6/6	342 (91.7)	339 (90.9)
6/9	25 (6.7)	29 (7.8)
6/18	2 (0.5)	3 (0.8)
6/50	3 (0.8)	1 (0.3)

Overall, 327 students (87.7%) had normal vision in both eyes, 26 (7%) had vision problem in one eye and 20 (5.4%) had vision problem in both eyes. The characteristics of 46 students with vision problems are shown in below table. Those with vision problems mostly had parents with low education and low income. There was no significant difference between urban and rural area in terms of vision problems.

Table 16 Characteristics of Students with Vision Problems

Characteristics	Vision problem in one eye	Vision problem in both eyes
Mean age (years)	10.7	11.4
Gender		
• Male	13	9
• Female	13	11
Area		
• Urban	13	12
• Rural	13	8
Parents' education		
• Primary school or lower	19	11
• Secondary school or higher	7	9
Parent's income*		
• =< Rp 2,000,000	20	15
• > Rp 2,000,000	6	5

*p-value<0.05

Perception of Parents towards Eye Health and the Use of Glasses

Knowledge on Low Vision

Most parents did not understand what “low vision” or “refractive error” was. When the term was explained, they referred it to as “minus eye” or “plus eye”. Most parents also believed that low vision can be overcome by using glasses. However, some parents had perception that using glasses might increase the severity of low vision. In contrast, other parents thought that using glasses can improve low vision or reduce the severity.

“I heard that using glasses can make the minus increase.” (FGD, rural secondary school)

“So glasses should be used until the minus is reduced.” (FGD, urban secondary school)

“I think for some children, they use glasses to protect eyes, so it would not get sick. For example they read a lot, like those bookworms. (Glasses) is to protect eyes so it would not get watery.” (FGD, urban primary school).

Most parents perceived that low vision is associated with child poor habit, for example prolonged exposure of screen especially from using mobile phone. Parents mentioned that children played with gadget too much. Parents also believed that watching television too much or too long is associated with low vision. Other poor habit associated with low vision was late night sleeping, lack of protection from dust such as glasses and helmet and also stress. A number of parents mentioned that lack of vitamin A-rich diet such as vegetables and fruit may cause low vision. Carrot was frequently mentioned as good for eye health.

“My relative eat raw carrots, she ate a lot like snack, and she said it is improved.” (FGD, urban secondary school)

Care Seeking Behavior for Eye Problems

Few parents ever had to seek care for eye problems. The majority of parents had little experience in seeking care for eye problems, especially for their children. Most often, children only had slight complaints such as itchy eyes because of dusts.

However, when there is a family member affected by eye problems, the majority of parents in urban areas preferred to go to health workers. Puskesmas were mostly preferred because these health facilities are typically quite close to home. In addition, most parents reported that they had good experience when they go to Puskesmas for other health problems. They usually obtained good service at Puskesmas. In contrast, parents in rural areas rarely accessed Puskesmas or hospitals for eye problems or general health problems in general.

Some parents also mentioned that their children had eye examination at school done by Puskesmas staff, although they did not really know what the results were.

Some parents mentioned that low vision can also be checked at optics, because people can purchase glasses directly. Few parents also suggested that eye care can be obtained at ophthalmologists. However, ophthalmologists are only available at the capital of the district, and to access ophthalmology service, it will entail significant costs especially for transportation.

“We were told to bring him (her husband who had eye trauma – red) to Mataram, but we did not have any money.” (FGD rural primary school)

Use of Traditional Remedies

Traditional remedies were often used by parents for treating eye problems, for example betel leaf, lime and even breast milk. Betel leaves are boiled and the water is used as an eye-drop.

“We can use betel leaf, we boil it with water and wait until cold, we put the water on a cloth and use it as an eye compress or an eye-drop.” (FGD, rural secondary school)

Some types of flowers and leaves can also be used for eyedrop. One of the types of the flower can be used

“For yellow eyes on newborn, we can use kelem flower, it’s more purple and it is especially for infants.” (FGD, rural secondary school)

“Sometimes we use breastmilk from breastfeeding neighbors. It has to be put directly into the eyes, and will reduce the symptoms. This is a thing that I know from my parents.” (FGD, rural primary school)

The role of traditional healer was also still significant, especially in rural areas. Some respondents reported that for any health problems, the traditional healer would provide remedies.

“In this area, if somebody is sick we rarely go to doctors, usually we will go to traditional healer (belian – red), we will ask for remedies. Because they are close by the villages, and it’s simple, we can also pay them with whatever we have.” (FGD rural primary school)

Attitude of Parents towards Glasses

Most of the parents agreed that glasses would just be used when they think the low vision is severe enough. There were some parents who reported that they could not really see clearly especially when they had to read small letters. However, they never had their eyes checked because of lack of money.

"I do not have any money, if I have money I would go. I can still see with my eyes, it is not that severe (yet). My income per day is not that much so I am not able to buy glasses." (FGD rural primary school)

"I will just forget (that I have no money), if I have money I would go for getting an eye-check." (FGD rural primary school)

The majority of parents also had good perception towards the use of glasses in children.

"I think if it is for the purpose of our health, it would be fine for children to wear glasses." (FGD urban secondary school)

"I think those who say it is a pity for children to wear glasses, do not know much about glasses. Those who understands about eye health will not say as such." (FGD urban secondary school)

Although the majority of parents thought that it is fine for children to wear glasses, it would be hard for them to purchase glasses with their own money. Parents reported that glasses will cost between IDR 400,000-2 million. Often, they would buy glasses at the market without knowing the measurement, as long as the glasses could help them to see more clearly. These glasses cost only IDR 30-150,000.

"I bought this glasses at the market, most importantly it fits, I can see clearer, so I bought it. I don't know if it was minus or plus glasses, I just felt it was fit so I bought it." (FGD rural primary school)

Wearing glasses was also associated with higher socioeconomic status. One parent reported that she actually had glasses at home, but she did want to use it because she thought people would think that she was snob because she had money to buy glasses.

One parent reported that his child is wearing glasses because of difficulties in reading. He bought the glasses using out-of-pocket money. He took the child for routine checking at ophthalmologist at the district capital which is around 2 hour drive from his home.

Among most parents, eye healthcare especially glasses was perceived expensive and affordable. Few parents knew whether eye healthcare would be covered under the national health insurance. Most of parents expected that should their children need glasses, there would be some financial support from the government or other parties.

“Well they should wear glasses when needed. But if we have to buy, I need to rethink about it over and over because we have no money.” (FGD rural primary school)

Student’s Attitude towards Eye Health and Glasses

When parents were asked about what their children think about eye health, parents reported that children rarely complain about eye problems or low vision to teacher or parents. Even children who were finally given glasses from screening at school, they did not know that they were nearsighted.

Although in general parents mentioned that wearing glasses is acceptable to children, some parents reported that children might be shy and even crying when asked to wear glasses. Children might be ashamed to wear glasses at school because they were mocked by their friends.

“Some of their friends might say, ‘How come you wear glasses, can’t you see? Now you have 4 eyes.’” (FGD rural secondary school)

“He didn’t dare to wear his glasses, he came home crying.” (FGD rural secondary school)

However, some parents asserted that usually children will feel shy only in the first few days of wearing glasses.

Some parents also mentioned that children only want to wear glasses when studying at home or reading at school. When playing, children would not use their glasses. However, other parents reported different experience.

“My child always uses glasses, the glasses does not interfere with her activities.” (FGD rural primary school)

Sources of Information for Parents

Most parents reported that information on eye health were obtained from various sources, such as advertisement or health programs on television, health workers and posters or leaflets at Puskesmas, teachers at school, internet and also friends or family.

The majority of parents expected that information on eye healthcare is provided by health worker or teachers at school. Most reported that they never received any information on eye healthcare.

Perception of Teachers towards Eye Health and the Use of Glasses

Knowledge on low vision

When being asked about low vision, some teachers associated low vision with general eye disorders such as eye infection. Teachers who did not have training on eye health did not know what refractive error is. However, when the term “blurry vision” was used, they referred it to inability to see clearly, for example, seeing things only as shadows or being not able to read what is written on the board. However, some teachers who had training on eye health were able to mention the general definition of refractive error, but not the detailed definition.

“Blurry vision, so the light does not fall exactly on the same hole, isn’t it?” (trained teacher, urban)

“Refractive error is a blurry vision, it should be checked by equipment. If his/her vision is blurry, it means that there is a refractive error.” (trained teacher, rural)

Those who had been trained seemed to have better knowledge on how to detect refractive disorders and where to report if any anomaly is found.

Most teachers associated low vision with a number of risk factors including 1) prolonged exposure to screen such as mobile phone, television and video games, 2) lack of healthy food such as green vegetables, carrot and protein, 3) hereditary, 4) poor reading habit such as reading while sleeping, 5) lack of eye protection and 6) lack of eye hygiene.

In addition, some teachers believed that refractive errors or low vision can still be improved by changing behavior. For example, to improve vision, teachers often suggested to students to reduce screen exposure from computers, mobile phones and television by reducing the use or the lights on the screen. Teachers also educated students to consume vitamin-A rich foods, reduce the time under direct sunlight, take rests and avoid playing in dusty and dirty places.

The majority of teachers knew that eye healthcare can be obtained at the Puskesmas. However, some teachers thought that eye healthcare can only be obtained at hospitals. On average, the distance from schools to the public health center was not that far.

Identification of Vision Problems at School

Teachers often observed behavior of their students in the classroom or during learning activities. Sometimes they noticed students who often shift their seats because they could not read what is written on the board. Teachers often suggested those children to sit in the front. They also reported that one of the signs of low vision or refractive errors was confusion of students when sitting in the back.

"He often shift to the middle...seems that he cannot read from distance." (FGD trained teacher)

"Often, when we enter the class, we observe the children, so every time he changes he seat, we ask, why change seats? They would answer, I cannot see the letters clearly sir." (FGD trained teacher)

Most teachers who had been trained by the District Health Office had performed screening at school. The majority understood that when they found vision problems, they needed to refer the students to Puskesmas. Most reported that there was no significant barrier when performing screening, except that they needed to find suitable time and often had to replace classroom sessions with screening. The majority of students were welcome to the screening. Some young students cried when eye screening was done because of fear of being hurt.

Attitude towards Glasses

Most teachers showed positive attitude towards glasses. Some teachers suggested that students need to go to doctors for thorough examination when there is a sign of vision problems. Also, when prescribed

glasses, students need to adhere to it. Teachers also mentioned the need for routine eye health screening at school and after screening students should be given glasses because there are many students who cannot afford glasses.

Sources of Information for Teachers

Teachers obtained information on eye health from different sources, including internet, television programs, prior education, student worksheet, and training.

“We read from the book, we have book on physical activity, it contains materials on eye health.” (non-trained teacher, rural)

Teachers who have not been trained perceived the needs of training in eye health, including how to screen for eye disorders and where to refer children with eye disorders. By training, teachers would be more confident to communicate with parents regarding eye health.

“I think all teachers, especially the homeroom teacher, need training in eye health because some teachers do not understand the eye screening method and its referral system.” (untrained teacher, urban)

DISCUSSION

This is the first study on knowledge, attitude and practice on eye health and the use of glasses in West Nusa Tenggara Province.

We found that knowledge on eye health or in particular low vision among parents and students was still poor. There was limited knowledge on the causes, signs, prevention and treatment of low vision. Poor knowledge was especially related to parental education and parental income, whereby parents with lower education and lower income were more likely to have poor knowledge on eye health, which is in line with previous study in India which showed that parental education and income contributed significantly to knowledge on eye health⁷. Provision of correct information is one of the key strategies to improve knowledge, however, most parents and students reported lack of information on eye health. For those who ever received information on eye health, the main information sources were media and health workers. Meanwhile for students, teachers were important information source.

Among parents and students, attitude towards glasses including the use of glasses was also moderately positive. Glasses were perceived as improving vision. However, in the group of low educated and low income parents, glasses were associated with better appearance and confidence. Such attitude may influence adherence to the use of glasses. Morjaria et al found that parental education is important to perception towards glasses wear⁸. A study conducted in rural China showed that 20.4% of teachers believed that wearing glasses would worsen children's vision, 68.4% felt traditional Chinese eye exercise could prevent myopia and 55.0% thought that children with modest degrees of myopia should not wear glasses⁹.

However, there was still prevailing negative attitude towards glasses. For example, a number of parents and students still perceived that glasses can worsen vision, create dependence, and limit activities⁹. In addition, feeling discomfort in wearing, being teased, and changes of look, perceived cosmetic and optical inconvenience are several personal reasons reflecting negative perception towards glasses, which is in line with previous studies⁸. Previous studies in developing countries especially in rural areas also showed that many stakeholders, including children, families, and teachers, still believe that wearing glasses will harm children's eye. They also think that glasses use should be delayed in children with early myopia¹⁰. Such attitude was still present in our parent respondents as well.

Although motivation and opportunity to access modern eye healthcare was quite high, we found that financial limitation was one of the main barriers to access eye healthcare. For those in rural areas, transportation costs were also barrier to access eye healthcare, especially as the availability of ophthalmologists in the NTB Province is limited in urban areas. Few parents seemed to know that eye healthcare including glasses is available at primary health centers. A study in India showed that one third of those who had visual impairment reported that they were aware of the problem, but do not feel the need for a consultation due to financial limitations¹¹. Numerous studies have revealed that economic constraints is the most common reported barriers to correction for refractive error in developing countries¹². Previous studies showed that the provision of free spectacles and examination improved compliance to glasses usage significantly¹³.

Traditional medicine was one important source for eye healthcare among parents. When there are some visual problems, some parents tend to choose to first use traditional medicine, perhaps because these are easy accessible and affordable. This is in accordance with previous studies in developing countries¹⁰ which showed that reliance of traditional medicine for eye disease still exist in the community.

Based on visual acuity test conducted by our trained enumerators, we found that less than 10% of students had visual problems. This is much lower than the study in Yogyakarta, which found myopia in 32.7% of students¹⁴. Other study found that the prevalence of visual impairment in children in Sumba and Yogyakarta was high, i.e. 25 (95% CI 0.19 to 0.32) and 0.23 (95% CI 0.18 to 0.29) per 1000 children³. However, we only performed visual acuity tests using tumbling E chart. Moreover, the data collection was done by non-health specialist, thus our method might be less sensitive in detecting refractive error.

We also found that screen exposure from television and gadget was quite high among students, with 70% students watched television every day with the duration of around 2 hours. Half of the students used gadget every day with the duration of around 2 hours as well. Parental education seemed to play a role in the duration of screen exposure. Our finding on high screen use is in line with previous studies on screen use among children. Previous studies have found a trend of association between hours spent by children using screens and myopia¹⁵.

The involvement of teachers in children eye health program could be beneficial in improving coverage and effectiveness of eye health program. Children use most of their time in school and there is a high chance for the teacher to identify refractive errors the students suffer from. Therefore, the knowledge of primary school teachers towards refractive error plays an important role in encouraging children to seek treatment for the eye problem and to enhance eye health seeking behavior⁴. However, teachers often have limited time and motivation to disseminate information and to perform screening to students. Moreover, the skills of teachers in conducting screening of visual impairment needed to be maintained and improved. Previous study found that the sensitivity of visual screening of teachers was around 25% compared to optometrists¹⁶.

CONCLUSION

The study found that knowledge on eye health and low vision among parents and children was low. The majority of parents did not know the cause of low vision, signs of low vision, as well as prevention and treatment of low vision. The attitude towards glasses were moderately positive among parents and students. Utilization of eye healthcare including eye healthcare for children was low, and knowledge on the access and availability of eye healthcare was also low. Motivation, trust and opportunity to eye healthcare were between moderate and high. Level of education and income of parents were consistently associated with understanding, motivation and opportunity to access eye healthcare services. However, perceived financial constraint was a major barrier for accessing eye healthcare and purchasing glasses when needed.

RECOMMENDATIONS

- **For policy**
 - In order to improve eye health programs for children especially for avoidable blindness, there should be better resource allocation by the government for the overall eye health programs.
 - Commitment should be gained from the district government through evidence-based advocacy to strengthen and allocate resources for eye health programs in their areas.
 - To improve the participation of other relevant stakeholders such as the education sector, a working group should be established at the provincial or district level.

- The reactivation of school health program supported by the cross-sectoral collaboration is one of the key to strengthen eye health programs for students. This could be done by reactivating the school health committee at the district level.
- **For practice**
 - As resources are limited, eye health programs should be targeted to children at risk, such as children in poorer areas with low level of education and income.
 - Programs should be targeted to improve knowledge of parents, students and teachers, using culturally appropriate and acceptable information materials.
 - Information should be targeted at parents with poor knowledge and negative attitude, particularly those with low education and low income. Information should contain relevant messages as follows:
 - The importance of eye health for children
 - Where, how and how often eye checks should be performed for children
 - Causes, signs, prevention and treatment of visual problems in children
 - Benefits of glasses
 - Availability of eye healthcare and glasses in primary health centers
 - Costs for eye healthcare and glasses
 - The involvement of teachers in eye health programs can potentially be beneficial to improve coverage of screening and information dissemination. However, in order to sustain this program, the following measures can be taken:
 - Gaining commitment from school stakeholders to support and motivate teachers to continue the school eye health program
 - Trained teachers should disseminate knowledge that they gained from training to their fellow teachers, especially classroom teachers who have intensive interaction with students.
 - Information on eye health and health in general should be incorporated in the lessons or every day interaction between teachers and students.
 - Teachers can also help in disseminating information about visual health in the surrounding community surrounding the school
 - The skills of teachers in conducting screening of visual impairment needed to be maintained and improved.

- **For research**

- Effectiveness of school eye health programs should be further evaluated in research, with clear outcome and robust design.
- Research focusing on the development and effectiveness of culturally appropriate information, education and communication materials for eye health should be conducted using qualitative design.

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