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Validity of the Eye Health Literacy Measurement Instrument for Elementary School Students

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Abstract

Background: Research on eye health among elementary school students in Semarang City showed that 22.5% had refractive errors, 36.3% had unhealthy habits such as looking at smartphone screens for too long and reading distance < 30 cm. This indicates that eye health literacy in elementary school children is still lacking. The study aimed to develop an eye health literacy instrument for elementary school children. The development research design was utilized to develop an instrument for measuring eye health literacy. This process consisted of three stages: preliminary study, development, and testing. A focus group discussion (FGD) was conducted to determine the dimensions and parameters of eye health literacy. Instrument testing was carried out through the assessment of five experts in the field of eye health. Content validity was calculated using the Aiken V formula. The study developed an instrument for eye health literacy consisting of 4 dimensions: 1) knowledge about eye health, 2) access to eye health information, 3) skills to maintain eye health, 4) access to eye health services. The expert validity test using Aiken's V coefficient showed that each item in the eye health literacy instrument was considered as valid (coefficient ≥ 0.92). Based on the results of the study, it can be concluded that the developed eye health literacy instrument is proven to have high content validity. It is suggested that further research is needed for the external testing stage.

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INTRODUCTION

Eye health problems in children is one of the problems that is often overlooked. During the COVID-19 pandemic, eye health problems in school children increased significantly. Online learning has changed the way children use computer or smartphone. Exposure to computer or smartphone screens has become longer. As a result of poor eye health behavior, the prevalence of refractive errors in primary school children has increased significantly. (Gao et al., 2012; Hughes et al., 2020; Rochmayani & Cahyaningsih, 2021).

Refractive errors are conditions where light entering the eye cannot be focused clearly. This makes the image of objects look blurry or not sharp. These errors can be caused by the length of the eyeball being too long or too short, changes in the shape of the cornea, and aging of the eye lens. The three types of refractive errors are myopia, hyperopia, and astigmatism, or a combination of these. Myopia is the most common, followed by hyperopia and astigmatism. (Angmalisang et al., 2021; Dana, 2020; Hayati & Mardalena, 2021; Wulansari et al., 2018).

Several studies have shown that the prevalence of myopia increases in children aged 6-12 years. The study in China of 3070 children showed that 12.51% had hypermetropia, 13.75% had myopia, and 11.17% had astigmatism. (Mowatt et al., 2018; Nintyastuti et al., 2016; Ranasinghe et al., 2016; Sánchez-Brau et al., 2020). The World Health Organization (WHO) published that refractive errors contribute 43% as one of the causes of vision loss. Uncorrected refractive errors are the primary cause of low vision worldwide. According to the International Agency for the Prevention of Blindness (IAPB) and the WHO, an estimated 153 million people worldwide had impaired vision due to uncorrected refractive error in 2006. Out of the 153 million people, at least 13 million were children aged 5-15 years, with the highest prevalence in Southeast Asia. (Jaiswal et al., 2019; Lindquist et al., 2011).

Refractive errors are the most prevalent eye disease in Indonesia. The prevalence of refractive errors continues to increase annually. The prevalence of refractive errors in Indonesia is estimated to reach almost 25% of the population or around 55 million people. A survey in 8 provinces of Indonesia conducted by the Ministry of Health in 2014 showed that refractive errors amounted to 61.71%. This ranks as one of the top ten eye diseases in Indonesia. (Hartanto & Inakawati, 2010; Hayati & Mardalena, 2021).

Eye health problems in school children have long-term adverse effects. Therefore, prevention efforts must be carried out primarily through appropriate health promotion. Increasing eye health literacy can help students avoid behaviors that cause eye health problems. According to a study by Rochmayani (2021) on the eye health of elementary school students in the city of Semarang, 22.5% of the students were found to have refractive errors. The study revealed that 36.3% of students practiced unhealthy habits such as looking at smartphone screens for too long and reading distance < 30 cm. These findings suggest a lack of eye health literacy among elementary school children. (Rochmayani et al., 2021; Rochmayani & Cahyaningsih, 2021).

Efforts to improve eye health literacy are needed to prevent eye health problems. Identification of eye health literacy of elementary school students needs to be done as a basis for developing eye health programs in schools. Therefore, it is necessary to conduct research to develop an instrument for measuring eye health literacy in elementary school children.

METHOD

This study used the development research method. The research was conducted to develop an eye health literacy measurement instrument. There are 3 stages in this development research, including: 1) Preliminary study stage, 2) Development stage, 3) Testing stage. The preliminary study stage was carried out to build the concept of eye health literacy based on literature studies. The concept was then elaborated into the main domains that formed the notion of eye health literacy. Each domain is then described in several parameters. Focus group discussions (FGDs) were conducted to refine the domains and parameters that would be used to measure eye health literacy. The FGD was conducted involving 6 experts, including: 3 refractive opticians, 1 doctorate in occupational

safety and health, 1 doctorate in public health, and 1 doctorate in education.

The second stage, development, was carried out by researchers by formulating the domain and parameters of the eye health literacy instrument. Expert input in FGD activities was used to develop eye health literacy instruments. After the eye health literacy instrument was successfully prepared, continued with the third stage, the testing.

The testing stage in this study was only conducted internally. The subjects involved in the internal testing were 5 eye health experts, consisting of 3 refractive opticians, 1 doctor, and 1 doctor of occupational safety and health. Testing was carried out by experts by giving a 4 Likert scale assessment of each question parameter item in the eye health literacy instrument.

The content validity analysis of the eye health literacy instrument was conducted based on the results of the n-person expert assessment of an item in terms of the extent to which the item represents the construct being measured. The formula used is Aiken V, as follows:

$V = \sum s / [n(c-1)]$

$s = r - lo$

lo = the lowest validity assessment score (e.g. 1)

c = the highest validity assessment score (e.g. 5)

r = the score given by the assessor

RESULT AND DISCUSSION

The development of eye health literacy instruments has been conducted through FGD. There are 4 dimensions to develop eye health literacy parameters and instruments, including: 1) dimension of knowledge about eye health, 2) dimension of access to eye health information, 3) dimension of skills to maintain eye health behavior, and 4) dimension of access to eye health services. Figure 1 below summarizes the 4 dimensions and 8 parameters generated from the FGD:

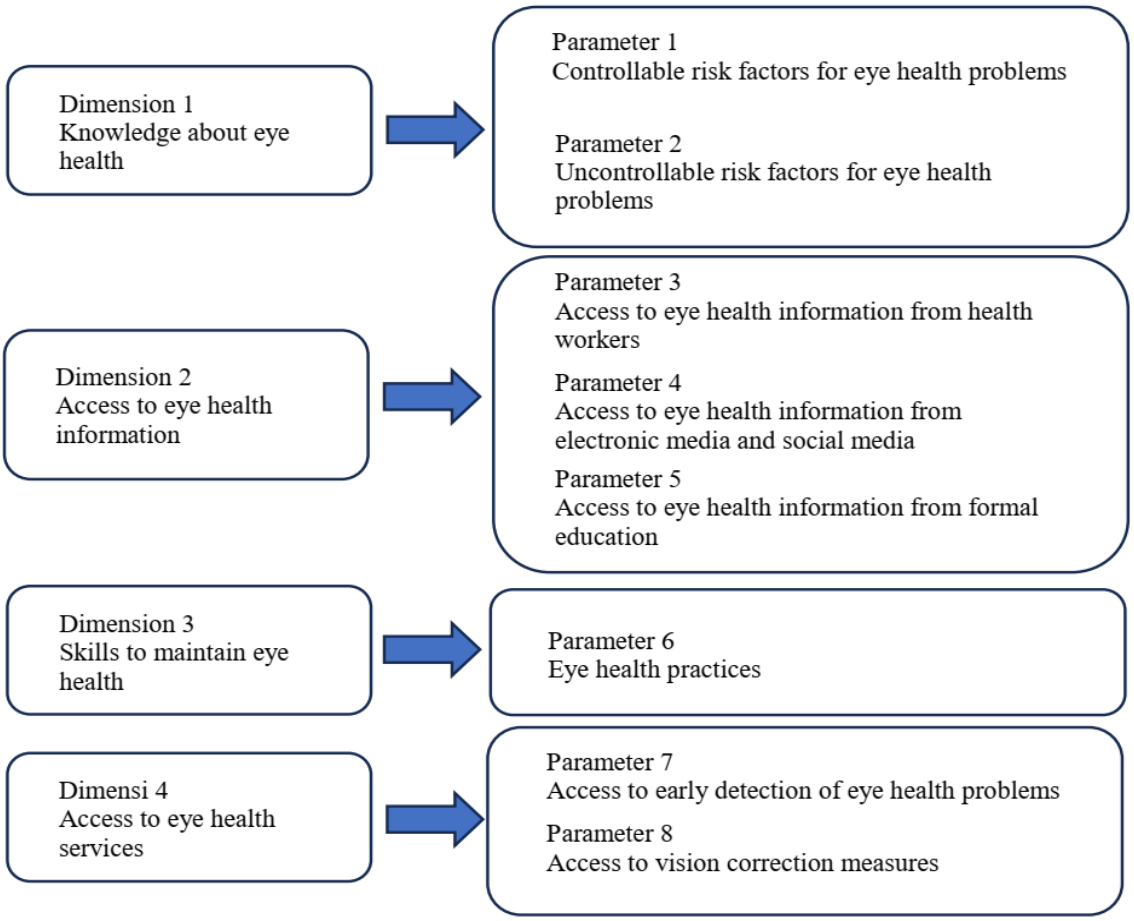

Figure 1. Eye health literacy dimensions and parameters from FGD

Based on the results of the FGD, a draft instrument for eye health literacy was developed. The eight parameters from the FGD were developed into question items. The draft eye health literacy instrument was then tested for content validity by experts. Table 1 below is the result of the content validity test of the eye health literacy instrument:

Table 1. Content Validity of the Eye Health Literacy Instrument

Dimension	Parameter	Question Item	CVI	Criteria
Dimension 1 Knowledge about eye health	1. Controllable risk factors for eye health problems	1. The minimum eye distance from the reading object is 20 cm	1,00	Valid
		2. Reading a book for more than 2 hours without a break can cause refractive errors	1,00	Valid
		3. When watching television, the distance between the eyes and the screen should not be more than 7 times the width of the TV screen	1,00	Valid
		4. When using a computer, the distance between the eyes and the screen is recommended to be > 50 cm	1,00	Valid
		5. When using a computer, the horizontal height of the eyes should be higher / parallel to the screen	1,00	Valid
		6. We need to rest our eyes after staring at the screen for 60 minutes	1,00	Valid
		7. The way to rest your eyes after staring at a computer screen is to look at a distant object for at least 20 seconds	0,92	Valid
		8. Resting your eyes after staring at a screen should be done by looking at a distant, shady object such as a tree	1,00	Valid
		9. To maintain eye health we also need food intake that contains a lot of vitamin A	1,00	Valid
	2. Uncon-trollable risk factors	10. Age is one of the uncontrollable factors for the occurrence of refractive errors	1,00	Valid
		11. Naturally, after the age of 20 people will start to experience visual impairment	1,00	Valid
		12. Children who have parents with refractive errors are also at a higher risk of developing refractive errors	1,00	Valid
Dimension 2 Access to eye health information	3. Access to eye health information from health workers	13. I actively/ voluntarily seek information about eye health from health workers	1,00	Valid
		14. I try to participate in educational activities about eye health organized by health workers	1,00	Valid
	4. Access to eye health information from electronic media and social media	15. I actively/on my own accord seek information about eye health from electronic media or social media	1,00	Valid
		16. Sometimes I read material about eye health from social media that I have	1,00	Valid
	5. Access to eye health information from formal education	17. I get material about eye health in learning activities at school	1,00	Valid
		18. I have participated in educational activities about eye health organized by health workers	1,00	Valid

Dimension 3 Skills to maintain eye health	6. Practice in maintaining eye health	19. I have a habit of reading with my eyes at a distance of > 30 cm	1,00	Valid
		20. I have a habit of resting my eyes for a moment in the middle of the activity when reading a book	1,00	Valid
		21. I have a habit of watching television from a comfortable distance to see the TV screen	1,00	Valid
		22. When using a computer, I have a habit of keeping my eyes at a distance of at least 50 cm from the screen	1,00	Valid
		23. When I use a computer, the horizontal height of my eyes is higher than the computer screen	1,00	Valid
		24. After staring at the screen for 20 minutes, I always rest my eyes for 20 seconds by engaging an object that is approximately 6 meters away	0,92	Valid
		25. I choose foods that are rich in vitamin A to maintain eye health	1,00	Valid
Dimension 4 Access to eye health services	7. Access to early detection of eye health problems	26. I have participated in eye health screening activities held by my school/health organization/community health service center	1,00	Valid
		27. I have health insurance/ BPJS	1,00	Valid
	8. Access to corrective measures for visual impairment	28. I have utilized the services of my insurance/ BPJS to get an eye health check-up 10	1,00	Valid

The eye health literacy instrument in this study consists of 4 dimensions. The dimension of knowledge about eye health consists of 12 questions. The access to information dimension consisted of 6 questions. The skills dimension consists of 7 questions. The dimension of access to health services consists of 3 items. Table 1 shows that the Aiken's V coefficient value of each item is ≥ 0.92. This indicates that the eye health literacy instrument model developed has high content validity.

The four dimensions successfully formulated in this study cover all concepts of eye health literacy. There are many definitions of health literacy. In general, health literacy consists of several concepts, such as knowledge for healthy living, access to health information, access to health services, skills and independence in maintaining health. (Kwan et al., 2006; Sanaeinasab et al., 2022; Thompson et al., 2022).

The eye health knowledge dimension consists of 2 parameters, which are knowledge about risk factors for preventable eye health problems, and risk factors for eye health problems that cannot be prevented. Knowledge of risk factors for eye health problems is the basis for the formation of positive behavior to maintain eye health. (Nopriadi et al., 2019; Sari et al., 2018; Yuanitasari et al., 2022).

Some of the risk factors that need to be known to maintain eye health are the distance between the eyes and the reading object that is too short; reading books for too long without a break, watching TV that is too close, the distance between the eyes and the computer screen that is too close, the horizontal height of the eyes when using a computer, using a computer without giving adequate eye rest time, and poor nutritional intake (Gao et al., 2012; Hughes et al., 2020; Lurati, 2018; Ranasinghe et al., 2016).

The dimension of access to eye health information is an important concept for measuring eye health literacy. Good access to information will be the basis for the formation of positive behavior to prevent eye health

problems. Eye health information can be accessed from various sources and ways, from the health worker, from mass media or social media, as well as information from learning activities at school (Dana, 2020; Rochmayani & Zulaekha, 2019).

The skills dimension of eye health behavior is an important concept in measuring the level of eye health literacy. The skills dimension includes the practices performed by students in preventing controllable risk factors. These risk factor prevention behaviors indicate a good level of eye health literacy (Achora et al., 2018; Gavine et al., 2017; Sarkar et al., 2020).

Access to eye health services is an important dimension to measure the level of eye health literacy. The ability to access eye health services is needed both for early detection of eye health problems, as well as for corrective action in the event of refractive errors. Therefore, the coverage of health insurance services and their utilization are important indicators in measuring eye health literacy (Sharma et al., 2012).

The eye health literacy instrument developed in this study has been shown to have high content validity. Therefore, it is necessary to conduct further research, that is to conduct external testing for this model of eye health literacy instrument to be widely applied in schools. (Sanaeinasab et al., 2022; Shrestha et al., 2014).

CONCLUSION

The research has developed a model of eye health literacy measurement instrument that has content validity. The instrument contains 4 dimensions, including 1) knowledge about eye health, 2) access to eye health information, 3) skills to maintain eye health, 4) access to eye health services. The validity test with Aiken's V coefficient showed that each item was valid (coefficient ≥ 0.92). It is recommended for further research, that is an external trial of the use of eye health literacy instruments on a broad scale.

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