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Risk Factors of Low Vision in Children

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ABSTRACT

Low vision and blindness is a vision disorder that becomes an important issue with regard to a person's independence. According to data owned by the World Health Organization in 2011, the number of blind people in the world reached 39 million, 246 million for low vision and 285 million for blindness. The purpose of this study was to know the incidence of risk factors in children with low vision in Low Vision Service Center Pertuni Yogyakarta, Indonesia. This study was an observational analytic study employed cross sectional design. The subject participated in this study was 139 children. Data were analyzed using correlation analysis. The instrument used was check list. There were relationships between the sex with low vision (p=0.028, RR=1.308), there was no relationship between regular eye checkup with low vision incidence (p=0.801, RR=1.054). There was relationship between the use of vision aids with low vision (p=0.000, RR=0.640), there was a relationship between the cataract with low vision (p=0.000, RR=1.472), there was a correlation between the refractive disorderwith low vision (p=0.000, RR=0.625).There should be an awareness of health behaviours in the use of vision aids as needed and balanced diet with sufficient physical activity and regular.

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1. INTRODUCTION

Sight is one very important factor in all aspects of life including the educational process and the main information point; hence the delay to make corrections, especially in children of school age will greatly affect the ability to absorb the learning material and reduced the potential to increase intelligence. Although the function of human life is very important, but often overlooked eye health, so many diseases that attack the eye is not treated properly and cause vision problems until blindness [1].

Based on the survey results Sense of Sight and Hearing in 1993-1996 the prevalence of blindness in Indonesia amounted to 1.5% with the main causes of cataract (0.78%), glaucoma (0.20%), incidence of incidence of refractive disorder(0.14%), retinal abnormalities (0.13%), corneal abnormalities (0.10%), and other causes (0.15%). Low vision and blindness is a vision disorder that becomes an important issue with regard to a person's independence. According to data owned by the WHO in 2011, the numbers of blind people in the world reached 39 million people, low vision and reach 246 million people who are blind to 285 million of soul [2].

Indonesia does not have baseline data on the prevalence of low vision which covers all the territory. Results of Health Research in DIY on 2007, the overall proportion of the population aged 6 years and above in the area of DIY who have low vision and blindness of 6.3% at 0.9%. The highest incidence of low vision is in Gunung Kidul district, but the lowest is in Sleman [3].

Low Vision Service Center Pertuni Yogyakarta (PLLVP) is a place of the people who have built up a referral system with low vision services in collaboration with hospitals, schools and government agencies concerned, the scope of activities include screening, counseling, clinical and functional examination, evaluation and training for teachers and health staff. Data from the Center for Low Vision Services Pertuni Yogyakarta, stated that since the year 1999-2012 has been providing care and rehabilitation to 2,618 people who have impaired vision due to low vision. Considering the high number of people with low vision both in children and old age, the researchers are interested in doing research on the incidence of risk factors in children with low vision in PLLVP Yogyakarta.

The definition of low vision according to the WHO in 1992, based on the functional definition is: "A person who has a visual function abnormalities, even after treatment, such as surgery and / or standard refractive correction (spectacles or contact lenses), visual acuity <6/18 - light perception and broad vision <10 degrees from the fixation point, but he was still able or likely to be able to use their vision to plan or carry out an activity / work" [4].

People with low vision have special characteristics, different from the visually disabled people with blind conditions. Low vision is not the same as blind as people with low vision just lost most of his sight, and still have some usable vision. The common traits that are often seen in people with low vision, which is to write or read a short distance, can only read large letters, squinting or frowning when viewing under bright light, looks do not stare straight ahead when looking something.The eyes look different, for example, white in the eyes (cataract) or clear part in front of the eyes look foggy (problems on the cornea) [5].

Initial examinations of patients with low vision are basically the same as for the examination of other patients, although it can be a bit more problematic. Examination for patients with low vision can be very tiring because it is done with a couple of visits and one-time checks should be no more than one hour. Examination requires general case history, together with a careful history, measuring the size of the glasses are used and aids other optical, measuring the distance and near visual acuity before / after correction, the subjective examination, color vision, contrast sensitivity, visual field, whatever perceived need.

In the second visit, more used to perform precise determination of refraction, visual field examination and examination of visual acuity expanded more fully. Far visual acuity examination is generally performed at a distance of 6 meters. According Colenbrander examination visual acuity in low vision is mostly done at a distance of 3 meters. The closer the object, the better the object is visible; the vision should be checked at a distance where the patient can see, not at a distance of 6 meters. If the patient can recognize the letters at a distance of 6 meters, she has a visual acuity 6/60. If the patient can only see at a distance of 3 meters then be 3/60 or visual acuity 6/120 [6].

On close examination of visual acuity to note is the size of the font and spacing read. Most practitioners recommend to check all the ability to read at a standard distance is 40 cm. For low vision examination, the examination distance remains very inappropriate, because the low vision patient requires a much shorter distance than patients with vision normal [6].

On the third visit, instrument aids can be tried. According to Troy E Fanin and Theodore P Grosvenor stressed that "optical aids are designed for patients who have low vision different from those designed for other patients because its primary purpose is to provide enlargement with or without changing the beam convergence dating [7]. The enlargement above is to increase the size of the shadow of the retina of the object being viewed, because by increasing the shadows on the retina it will be followed by an increase in visual acuity. Optical aids for far vision system is used in the form telescope mounted on a frame glasses and held hands. The aids required for near vision optical aids such as Magnifying Glasses, Magnifier and Close-Circuit Television/CCTV [7].

Some of the factors related with the occurrence of low vision in children include sociodemographic factors that include age, gender, race and genetics and health behaviors. Other factors are also associated with the occurrence of low vision is the presence of other comorbidities, both systemically and in the anterior segment of the eye such as a history of cataract, and history of refractive disorder [8].

2. RESEARCH METHOD

This type of research usedquantitative methods with the type of cross sectional design, the aims of this study to determine the relationship between cataract, incidence of refractive disorder, the use of visual aids and periodic eye checkup with events at Children's Low Vision in Low Vision Service Centre PertuniYogyakarta. The subjects of this study were 139 children. The data used in this study were primary data taken directly from the research subjects coupled with secondary data on get from the observation and documentation. The instrument used in this study was a check list for the observation sheet.

Univariate analysis employed to explain or describe the characteristics of each variable. Bivariate analysis was conducted to determine the relationship of each variable on the low vision research. Multivariate analysis to determine which variable are most influential occurrence of low vision.

3. RESULTS AND ANALYSIS

3.1. Descriptive Analysis

Results of univariate analysis are shown in Table 1. Table 1 shows that there is no difference in the number of samples in this study based on gender because the average is almost the same, whereas by age more is the age group of 7-12 years in the study sample. Based on the status of low vision are found subjects who suffer from low vision as many as 104 children (74.8%).

Table 1. Characteristics of respondents incidence of low vision in children

Characteristic	Amount	Presentage (%)
Age		
1-6 years old	33	23.8
7-12 years old	69	49.6
12-18 years old	37	26.6
Sex		
Male	71	51.1
Female	68	48.9
Use of aid sight		
Do not use	90	64.7
Wear	49	35.3
Periodic examination		
No periodic	38	27.3
Periodic	101	72.7
Chataract		
Chataract	45	32.4
No chataract	94	67.6
Refractive disorder		
Refractive disorder	82	59.0
No refrative disorder	57	41.0
Amount	139	100

According to the history of the use of visual aids, in this case that does not use visual aids most respondents use visual aids, while based on periodic inspection found that the majority of respondents do not perform periodic inspections. Based on the diagnosis of the disease is found most respondents did not cataract and most respondents had a history of refractive disorder.

3.2. Bivariate Analysis

Bivariate analyzes were conducted on two variables expected to relate or correlated [9]. In this study bivariate analysis was conducted to determine the relationship of the independent variables with the incidence of low vision. The statistical test used is Chi square.

Table 2. Relationship Between Risk Factors With Low Vision

Variable	Status of Low Vision				Total		RR	Sig
	Low vision		Normal					
Sex								
Male	56	40.3	15	10.8	71	51.1	1.308	0.028
Female	41	29.5	27	19.4	68	48.9	(1.042-1.642)	
Used vision aid								
Do not use	55	41.0	35	25.2	90	64.7	1.403	0.005
Wear	42	30.2	7	5.0	49	35.3	(1.148-1.714)	
Periodic eye examination								
No periodic	28	20.1	10	7.2	38	27.3	0.927	0.684
Periodic	69	49.6	32	23.0	101	72.7	(0.735-1.169)	
Chataract								
Chataract	43	30.9	2	1.4	45	32.4	1.663	0.000
No chataract	54	38.8	40	28.8	94	67.6	(1.382-2.001)	
Refractive disorder								
Refractive disorder	42	30.2	40	28.8	82	59.0	0.531	0.000
No refractive disorder	55	39.6	2	1.4	57	41.0	(0.427-0.659)	

Table 2 shows that the factors associated with the incidence of low vision is sex with sig. of 0.028, the use of vision aids with sig. of 0.000, a history of cataract with sig. of 0.000 and refractive disorderwith sig. of 0.000. Factor that had no association with the incidence of low vision is periodic eye checkup (sig. 0.801).

3.3. Analysis of Multivariate

Table 3 illustrates that the factors most influential occurrence of low visionis refractive disorder with sig=0.000.

Table 3. Results of Multivariate Analysis

Variable	Koef.	S.E	Wald	df	P value	OR	CI 95%	
							Min	Max
Refractive disorder	3.219	0.756	18.126	1	0.000	24.99	5.68	110.01
Constanta	-2.921	0.744	15.410	1	0.000	0.05		

4. DISCUSSION

4.1. Relationship Sex with Low Vision

From the research on 139 respondents who were tested, of 71 respondents male gender there are 56 children (40.3%) were low vision and normal 15 children (10.8%). Whereas of the 68 respondents are female sex 41 children (29.5%) were low vision and 27 normal children (19.4%). Statistical analysis using chi-square test sig<0.05 (sig=0.028), meaning that there is significant relationship between the sexes with low vision. In bivariate analysis obtained RR=1.308 can be said that the respondents in child sex men will have low vision as the risk 1.308 times greater than the respondents in children female gender.From research by others said that there were no significant differences between the sexes in this study (sig=0.526) [10]. In contrast, the difference in prevalence between boys and girls, where male were 66 children (40.49 %) and female were 97 children (59.51%) [11]. This may be related to not achieving equality of health services between genders. Parents tend to pay more attention to boys than girls. Differences in the frequency of disease morbidity between men and women are partly due to differences in work, life habits, and genetics or conditions fisiologis [12].

4.2. Relationship Use vision Aid with Low Vision

From the research on 139 respondents who were tested, of the 48 respondents who do not use visual aids there are 47 children (33.8%) were low vision and normal 1 child (0.7%). While the 91 respondents who use vision aids are 57 children (41.0%) were low vision and 34 normal children (24.5%). Statistical analysis using chi-square test with sig<0.05 (sig=0.005), meaning that there is a statistically significant association between the use of vision aids with low vision incident. In bivariate analysis obtained RR=0.640 can be said that the respondents in children who do not use the tools will have as much risk of developing low vision 0.640 times greater than the respondents in children taking visual aids.

In general, low vision aids exist in the form of shaped glasses, magnifying glass, telescope (binoculars) and CCTV. Children with low vision may be helped by a variety of low vision aids and need encouragement to use it either at home, at school or on the playground. Children often refuse aids low vision on first inspection, but with encouragement and training in the use of optical aids and non optics they are able to use it as much as possible. There needs to be collaboration between children, teachers and parents. Because forcing a child to want to use the tool can cause children to rebel and refuse to use them and do not want to aknowledge the benefits of the tool. Until recently the use of low vision aids is still very low, especially for children because many of those who already have a fixed visual aids do not want to use the excuse embarrassed, uncomfortable, heavy, headache, hassle and lazy. The use of optical aids and non-optical is good and right will increase the power of their vision, the less they do not use the tools of low vision aids the possibility of eyesight they will decrease [13].

4.3. Relationship Periodic Eye Examination with Low Vision

From the research on 139 respondents who were tested, of the 103 respondents who are not eyes examined regularly are 76 children (54.7%) were low vision and normal 27 children (19.4%). While the 36 respondents eyes examined regularly there are 28 children (20.1%) were low vision and 8 normal children (5.8%). Statistical analysis using chi-square test with sig > 0.05 (sig=0.684), meaning that there was no statistically significant association between regular eye examinations with the incidence of low vision. In

bivariate analysis obtained RR=1.054 can be said that the respondents in children without eyes examined regularly will have low vision as the risk 1.054 times greater than the respondents in children eyes examined regularly, there is a relationship between the biological abundance, periodic eye checkup the incidence of low vision.

The proportion of low vision and blindness are the population group that does not work followed by a group of farmers or, fishermen or laborer. The proportion of low vision and blindness tends to be higher in rural areas than urban, but almost evenly distributed across all levels of household expenditure perkapita [8]. Location with low vision can spread to remote areas, and mostly from poor families so as to perform eye examinations a year once a minimum is a difficult thing for them to do. It takes knowledge, effort, investment of time, energy and even costs. Kebulan eye condition of the month, year to year will experience the difference. Although sometimes the difference is not much, it is still very important to regularly check the eyes, so that the eyes are always healthy. Thus, if there is a visual organ dysfunction that may not or not we are aware, the eye doctor can detect it early, and if necessary, take action medis [14].

4.4. The relationship with Low Vision Cataract

From the research on 139 respondents who were tested, of the 45 respondents with a history of cataract there are 43 children (30.9%) were low vision and normal 2 children (1.4%). Whereas of the 94 respondents who did not have histories of cataract are 61 children (43.9%) were low vision and 33 normal children (23.7%). Statistical analysis using chi-square test with sig<0.05 (sig=0.000), meaning that there is a statistically significant association between a history of incidence of cataract with low vision. In bivariate analysis obtained RR=1.472 can be said that the respondents in children who have a risk of developing cataract will have low vision as much as 1.472 times greater than the respondents in children who do not have cataract.

Some studies of low vision and blindness indicate that cataract is the most common cause is found in the community and increased with age. In the study conducted others said that 108 patients were diagnosed pediatric cataract, only 46 patients with 58 eyes that meet the criteria inklusi [15]. This caused a lot of patients who have been diagnosed are not returned to the clinic for further management is done because of lack of funds and lack of knowledge parents about the state of the child's vision so do not know the long-term effects caused by cataract. The main cause of loss of vision due to cataract in children is amblyopia (lazy eye).

From several observations and surveys in community acquired cataract prevalence is higher in lower educated groups. Although not found a direct relationship between level of education and the incidence of cataract, but the level of education can affect the socio-economic status, including employment and status of nutrition [15].

4.5. Relationship with Low Vision Refractive Disorders

From the research on 139 respondents who were tested, of the 83 respondents with a history of incidence of incidence of refractive disorderthere were 50 children (36.0%) were low vision and normal 33 children (23.7%). Whereas of the 56 respondents who did not have a history of refractive disorders there are 54 children (38.8%) were low vision and 2 normal children (1.4%). Statistical analysis bivariate using chi-square test with sig<0.05 (sig=0.000), meaning that there is a statistically significant association between a history of incidence of incidence of refractive disorderwith the incidence of low vision. In bivariate analysis obtained RR=0.625 can be said that the respondents in children who have incidence of incidence of refractive disorderwill have the risk of low vision as much as 0.625 times greater than the respondents in children who do not have incidence of refractive disorder. Statistical analysis multivariate with logistic regretion with sig=0.000, meaning that refractive disorder is factor most influential to occurrent of low vision.

In studies conducted by others that of 185 children, found 5 children with incidence ofrefractive disorder (40% male and 60% female) were significant and no different with this study [10]. Contrast, of 163 patients with refractive disorderin children, types refractive disorders are the most common is myopia were 117 patients (71.78%). 11 Refractive disorders is an eye disease that can be corrected with the glasses, but it seems there are still many people who do not get optimal correction. Uncorrected incidence of refractive disorderthat can lead to amblyopia or lazy eye so that vision will tend to decline and can lead to blindness. This can be caused by various factors, such as the activities and habits of children, such as habits do not want to use aids such as glasses in the child's activities outside the home or in the home, reading while lying down, television viewing habits are too close and lack of parental knowledge about the importance of visual aids for children that do not know the long-term effects caused by disorder refractive [10].

5. CONCLUSIONS

There was no relationship between periodic eye check-up with the incidence of low vision and there was a relationship between sex, use of visual aids, cataract and incidence of refractive errorwith the incidence of low vision. To decreased the low vision there should be an awareness of health behaviours in the use of vision aids as needed and balanced diet with sufficient physical activity and regular.

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