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RESEARCH ARTICLE

The Profile of Blindness Aetiology in Children of SLB/A Denpasar

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Abstract

Introduction: Blindness in children is one global problem that adressed by the World Health Organization (WHO) to achieve VISION 2020 "The Right to Sight". Blindness also occurs in high prevalence in Indonesia, but study evaluating blindness in childres is rarely conducted. Thus, this study aimed to evaluate and compiled the profile of the etiology factors related to blindess in children in Denpasar, Bali. Method: An cross sectional-obervational analitic study were conducted in SLB / A Denpasar in November 2017 and the data were collected prospectively. The samples of this study were all children in SLB/A Denpasar who met the inclusion criteria. All of the data were analyzed using SPSS 17.0 Result: 37 children were enrolled in this study and consist of 23 (62%) men and 14 (38%) women. Most participants were in the range of 12-14 years old (12 [32%]) followed by 17-20 years (11 [30%]), 9-11 years old (7 [19%]), age 15-17 years (5 [14%]) and age 6-8 years (2 [5%]). According to the visual acuity (VA), the most prevalent eye condition was severe visual impairement (<6/12 – 6/18) with 12 children (32.42%) followed by blindness (VA<3/60) in 11 children (29.72%), moderate visual impairement (<6/18 – 6/60) in 11 children (29.72%) and early visual impairement (<6/12 – 6/18) in 3 children (8.11%). In terms of eye disorder, the most prevalent was ptisis bulbi 5 children (13.5%), followed by leucoma cornea in 4 children (10.8%), nystagmus and microcornea in 2 children (5.4%). The cause of blindness in children in SLB / A was papil atrophy (18.9%), ptisis bulbi (13.5%), and leucoma cornea (8.1%). The congenital cataract with nystagmus and microcornea was found in 4 childen (10.8%) while pseudofakia with PCO was found in 3 children (8.1%). Meanwhile, congenital cataract with nystagmus and microcornea was found in 2 children (5.4%). Conclusion: It can be concluded that the cause of blindness in chlidren in SLB / A were papil atrophy, congenital cataract with nystagmus and microcornea.

Keywords: *Blind, SLB / A, Visual Acuity, Congenital Cataract, Papil Atrophy.*

Introduction

Blindness in children is one of the priorities of the World Health Organization (WHO) in an effort to eradicate preventable blindness to achieve VISION 2020 "The Right to Sight" [1, 2, 3]. Currently, there is not much research data about the prevalence and causes of blindness in children [4, 5, 6]. In 2001, WHO stated that the number of blindness in children reached 1.5 million cases worldwide with one million cases were from Asia; 0.1 million cases from Latin America and the remaining 0.1 million were from Europe and Australia [7, 8, 9]. The prevalence of severe visual impairment and blindness in children in Europe varies between 0.1 to 0.41 per 1000 children Investigation on the causes of blindness has not been done in Bali. Until now, there is no data that states the prevalence of blindness in Balinese children. The primary cause is the large amount of costs required to conduct such community based study [13, 14, 15]. This study was carried out in blind schools/Extraordinary A-Schools (which for the next part of this paper will be abbreviated as SLB/A) Denpasar, Bali. The researchers collected data on the characteristics of the children who are living and studying in SLB/A Denpasar such as visual acuity, anatomical disorder, and causes of blindness. The collected data is expected to be a reference for prevention, treatment, and blindness rehabilitation programs in children and especially in SLB / A Denpasar. The data about ophthalmologic disorders in children of SLB/A is still poorly

recorded. SLB/A in Denpasar is one of the SLB/A in Bali that educates approximately 35 children with visual impairments. The school itself located in the center of Denpasar and has sufficient access to the ophthalmology center in Bali. A good record certainly will be useful for references for prevention of preventable blindness in children as well as for treatment decision and follow up schedule. The purpose of this study generally was to record the profile of the causes of blindness in children in Denpasar's exceptional blind schools (SLB/A) with specific to observe the characteristics of visual acuity, anatomic abnormalities, the causes of blindness in children at SLB/A Denpasar.

Methods

An observational analytic study with a cross sectional study approach was conducted in SLB/A Denpasar for 1 year. The data were collected prospectively by visiting the school to record the student history and conducting ophthalmologic checkup. Data collected includes the characteristics of the subject both from medical records, relevant history taken from the parents and teachers, visual acuity, and the anterior and posterior segment examinations.

All subjects were evaluated according to inclusion and exclusion criteria. Inclusion criteria are children in SLB/A who lived and attended school in Denpasar and willing to participate in research and signed an informed consent (by guardian). The exclusion criteria are children at SLB / Awho were not present during the examination. According to the sample size calculation formula, a minimum of 35 samples were needed to maintain the validity of this study [16].

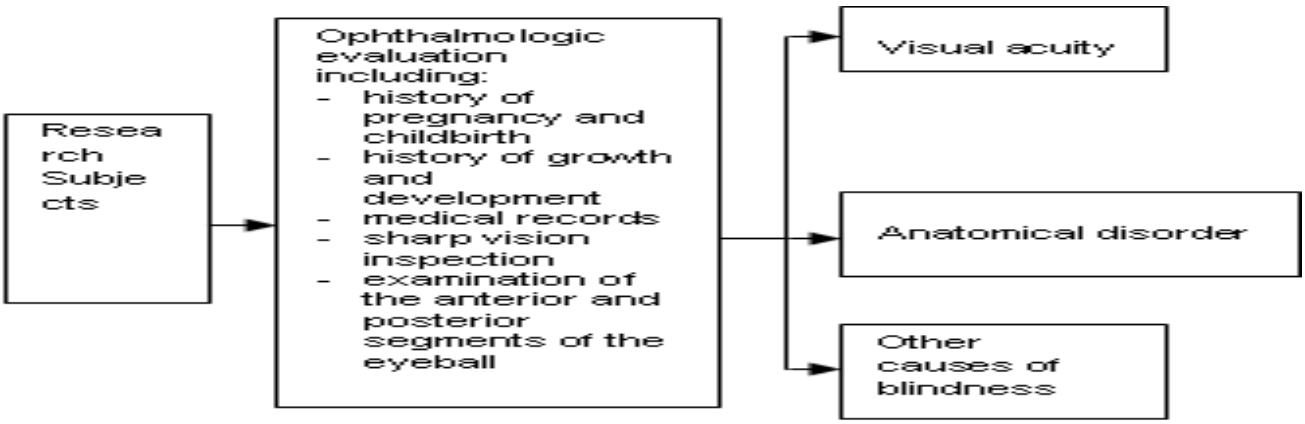

Figure 1: The design of the study in this research

The visual inspection was conducted using standard Snellen method while visual acuity evaluation and the examination of the anterior segment and the posterior segment of the eye were performed by ophthalmologist. All of the data were compilated and analized using Spss 17.0.

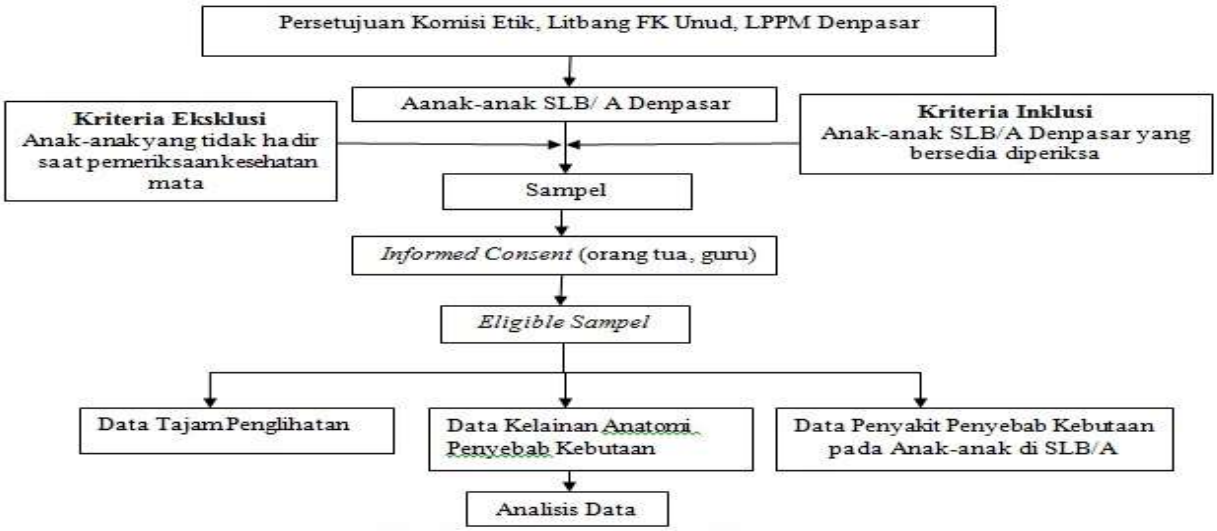

Figure 2: The roadmap of the study

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Table 1: The characteristics of the subjects

Karakteristik	N	%
Sex		
Male	23	62
Female	14	38
Age		
6-8 Years Old	2	5
9-11 Years Old	7	19
12-14 Years Old	12	32
15-17 Years Old	5	14
>17 Years Old	11	30
Level of Education		
Elementary School	9	24
Junior High School	2	6
N/A	26	70
Visual Acuity Impairment		
OD	36	97
OS	37	100
ODS	36	97
Visual Acuity OD/OS		
NLP	OD 10 /OS 10	
LP	OD 4 / OS 4	
HM	OD 7 / OS 11	
1/60-2/60	OD 8 / OS 6	
3/60	OD 2 / OS 1	
4/60	0	
5/60-6/60	OD 4 / OS 1	
6/60-6/24	OD 0 / OS 2	
6/24-6/18	0	
6/18-6/10	0	
6/10-6/6	OD 1 / OS 0	
FL	OD 1 / OS 1	
Protesa	OD 0 / OS 1	
Ophthalmology Disorders		
Blindness (<3/60)	11	29,72%
Severe Visual Impairement (<6/60-3/60)	12	32,42 %
Moderate Visual Impairement (<6/18-6/60)	11	28,72 %
Early Visual Impairment (<6/12-6/18)	3	8,11 %
Anterior Segment Disorder		
Corneal cicatrix	OD 5 / OS 4	
Corneal oedema	OD 1 / OS 0	
Microcornea	OD 5 / OS 5	
Symblepharon	OD 1 / OS 1	
Corneal dystrphy	OD 2 / OS 2	
Corneal neovascularization	OD 2 / OS 1	
Narrow anterior chamber	OD 2 / OS 5	
Seclusio pupillae	OD 3 / OS 1	
Updrawn Pupil	OD 0 / OS 1	
Lens cloudiness	OD 2 / OS 3	
PCO	OD 2 / OS 1	
Posterior segment disorder		
Vitreal cloudiness		
Papillae Atrophy	OD 7 / OS 6	
Traumatic Optic Neuropathy	OD 1 / OS 1	
Retinitis Pigmentosa	OD 1 / OS 1	
Causes of Blindness		
Corneal Leukoma	4	10.8 %
Microcornea	2	5.4 %
Pseudophakia + PCO	3	8.1 %
Congenital cataract	2	5.4 %
Papillae Atrophy	7	18.9 %
Retinitis Pigmentosa	1	2.7 %
Nystagmus	2	5.4 %
Phthisis bulbi	5	13.5 %
Cortical Visual Impairment	1	2.7 %
Traumatic Optic Neuropati	1	2.7 %
Congenital Glaucoma	1	2.7 %
Congenital cataract + PCO + aphakia + Microcornea + nystagmus	4	10.8 %
Corneal Dystrophy	2	5.4 %
Retinal Detachment	1	2.7 %
Symblepharon	1	2.7 %

37 children were enrolled in this study that studied and lived in SLB A consisting of 23 (62%) male and 14 (38%) female. The highest age in this study was 12-14 years old (12[32%]), followed by age 17-20 years (11 [30%]), age 9-11 years (7 [19%]), age 15-17 years old (5 [14%]), and the age of 6-8 years (2 [5%]). According to visual acuity, the subjects were divided into 4 categories, namely blindness (<3/60) (11 [29.72%]), severe visual impairement (<6 / 60-3 / 60) (12 [32.42%]), moderate visual impairement (<6/18-6/60) (11 [29.72%]) and early visual impairement (<6/12-6/18) (3[8.11%]). The eye bulb abnormalities that recorded in this study were phthisis bulbi (5 [13.5%]), followed by corneal leukoma (4 [10.8%]) and followed by nystagmus and microcornea (2 [5.4 %]).

Meanwhile, based on the cause of blindness there were 7 subjects with atrophic papilla (18.9%), 5 subjetcs with Phthisis bulbi (13.5%), 4 children with corneal leukoma (10.8%), 4 subjects with pseudophakia, PCO, nystagmus and microcornea (10.8%), and 3 were found with pseudophakia and PCO (8.1%). Congenital cataracts plus nystagmus and microcornea were found in 2 children (5.4%). The cause of blindness in children at SLB / A is atrophic papilla as many as 7 children (18.9%), followed by bulbi ptisis namely 5 children (13.5%), corneal lekoma as many as 4 children (10.8%), pseudofakia accompanied by PCO, nystagmus and microcornea in 4 children (10.8%), pseudophakia accompanied by PCO as much as 3 (8.1%). Congenital cataracts accompanied by nystagmus and microcornea were found in 2 children (5.4%) in this study.

Discussion

This study is a preliminary study to determine the characteristics and profiles of the causes of blindness in blind children in special schools (SLB / A). This study is considered to be important because there is still no concrete data about the prevalence and incidence as well as the corresponding cause of blindness in children in Bali and Indonesia. Meanwhile, according to the international statictics, the number of blindness in children is quite significant especially in those with congenital diseases. In regards of the cause of blindness in Indonesia, several studies had been conducted to delineate its statistics.

Sitorus etl.al (2003) showed that the most common antomical location of the abnormalities that causing blindness in children in the "Wiyata Guna" Blind Home, Bandung, were both eyebulbs (32.7%), retina (26%), cornea (17.6%), lens (13.3%), optic nerve (6.1%), and ciliary body (4.3%)[17,18]. In this study, the majority of the children had moderate to complete blindness while only less than 10% had early visual impairment. The most common specific cause was papillae atrophy (18.9%), ptisis bulbi (13.5%), corneal lecoma and combinational disorders (Congenital cataract + PCO + aphakia + Microcornea + nystagmus) which were found in 10.8% each.The eyeball is a two-ball system with different volumes, where smaller balls are located inside a larger ball.

The front of the small sphere forms the anterior segment of the eye, while most of the spheres form the posterior segment of the eye [19, 20, 21]. The anterior segment is bounded by a clear cornea in front, and a lens and lens hanger on the back [22, 23]. The posterior segment is located behind the lens and consists of the vitreous, and retina [24, 25]. Acquiring statictical data about the causes of blindness in children is an important step in improving ophthalmology health as a basis for program development and treatment strategy. According to our data and previous studies, about 25% of the etiologic factors of childhood blindness are preventable or manageable. Thid facts are important since in most cases, lack of parental knowledges about these condition lead to untreated eye condition that could lead to total blindness.

This condition could potentially hamper the mental development of the children since the optical stimulus is one of the important factors that affect cognitive development even in children with mental disorder. Thus, it is important to devise a larger study and develop a comprehensive strategy to educate the parents and manage the children with blindness in order to improve their mental and cognitive development. However, due to the small scale of this study, some weaknesses are needed to take into consideration in interpreting the result of this study. First, the number of sample was small so this study may not represent real condition and larger scale study is needed to confirm the findings. Second, this study only conducted in one location.

Ideally, multiple locations with different demographic characteristic should be involved in order to counter location bias. And third, the developmental and medical data presented in the school's records are incomplete, so the full scale of the impact of the blindness as well as validation of its causes were difficult to do. Nevertheless, this study can be a basis for larger and more comprehensive study in the future.

Conclusion

From the findings, it can be conclude that most of the children in the SLB/A school had moderate to complete blindness and the most prominent causes of blindness were papillae atrophy, phtisis bulbi, and corneal leukoma and combined eye disorders. Further study with more comprehensive design with larger sample is needed to confirm these findings and also to enable better results generalization.

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