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Prevalence of refractive error at rural junior high students In Badung District

Ni Made Ari Suryathi*, Ni Made Laksmi Utari, Ariesanti Tri Handayani, Ari Andayani, I Wayan Eka Sutyawan, I Wayan Gede Jayanegara

ABSTRACT

Introduction and Purpose: Refractive error is common in school age children. The prevalence of refractive error is 23-25% at 12-15 years of age. Refractive error is related with increasing of close range activities, use of gadgets, reading habits, and minimal outdoor activities.

Method: This research is a cross-sectional descriptive study to determine the characteristics of refractive error that occur in junior high school students in rural areas in Badung Regency. The data obtained can be a reference for community eye health services and as a basis for increasing outdoor activities for school age children.

Result: Junior High School I, II, IV Petang is a junior high school located in a rural area in Badung Regency. Two hundred twenty-two Petang I, II, IV Junior High School students was examined anterior and posterior segment of eyeball and found the prevalence of refractive error is was 13.96%, which 6.3% myopia, 1.8% myopia astigmat simplex (MAS), 3.15% myopia astigmat compositum (MAC), and 2.71% myopia and amblyopia. Seventy-seven percent of students who use glasses have optimal vision after using glasses (visual impairment).

Conclusion: Rural areas, adequate outdoor activities, minimum close range activities are factors that can reduce the prevalence of refractive error in school aged children.

Keywords: refractive error, rural, Junior High School, myopia, prevalence

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[1]Ophthalmology Department, Faculty of Medicine, Udayana University, Sanglah Hospital, Denpasar

*Correspondence to;
Ni Made Ari Suryathi;
Ophthalmology Department, Faculty of Medicine, Udayana University, Sanglah Hospital, Denpasar;
arisuryathi@gmail.com

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INTRODUCTION

Vision health is an important requirement to improve the quality of human resources in order to realize Indonesian people who are intelligent, productive, advanced, independent and prosperous physically and mentally.[1]

Refractive error are the highest cause of visual impairment and the second highest cause of blindness in the world. People with visual impairments include blindness due to refractive error in 2010 as many as 108 million people.[1,2,3]

Refractive error are one of the priority components of the VISION 2020 global initiative.[2,4] Nineteen million children under the age of 15 are estimated to have visual impairments, 12 million of which are due to uncorrected refractive error that can interfere with children's learning development, career determination and work opportunities in future. More than 1 million of them experience lifelong blindness and need visual rehabilitation.[1,4]

Myopia is a type of refractive error with the highest prevalence which generally starts at the age of 9-10 years and gradually worse until the age of 20 years. Hypermetropia usually starts at an early age and gets better until finally the vision becomes normal at the age of 10 years. Another type of refractive error is astigmatism or blurred vision in which light is reflected in two different foci in the eye. Astigmatism can occur in all age groups and usually does not weigh up or improve over time.[2,3]

The prevalence of visual impairment due to astigmatism in school-age children was reported in several studies with a high scope of variation.[1,2] Studies conducted in Ba Ria-VungTau Province, Vietnam said that astigmatism was the cause of 0.7% of visual impairment in school children aged 12 -15 years.[2]

Studies in rural populations in Iran found that 14.3% of children under the age of 15 suffer from astigmatism.[4] Another study conducted in Singapore found evidence that 19.3% of school students aged 7-9 years suffer from significant astigmatism (± SE 1 D). 1.5 The prevalence of myopia refractive error differs in every race in the world such as 26% in Caucasian races, 50% in Asian races, and 12.5% of African races.[2,4] The highest prevalence is in the age range of 11-15 years and increases with age.[3,5] The prevalence of hypermetropia decreases with age increase of 5% at the age of 7 years, 2-3% in the 9-14

year age range and 1% at the age of 15.[6,7]

Risk factors for refractive error are multifactorial.[2,7] Hereditary factors namely parents with refractive error increase the risk of children to suffer from refractive error.[7] Other factors such as age, sex, living in urban areas (urban), less outdoor activities affect the occurrence of refraction abnormalities.[7,8] Technological advances and telecommunications such as television, video games, computers, and others - the current use has reached rural areas. The assignments given from school also currently require more students to use computers in terms of completing education.[8] This can increase close viewing activities especially in school-age children thereby increasing the risk of refractive error in school children.[9]

Refractive error screening for junior high school students in rural areas has never been carried out in Bali.[11] Badung Regency is a district consisting of 6 sub-districts and 62 villages. Some junior high schools in Badung regency are located quite far from the city center.[11]

METHOD

This research is an observational analytic study with cross sectional study approach. Data collected prospectively. Data collection was carried out by visiting junior high schools in rural areas in Badung regency. The data collected included the characteristics of junior high school students' subjects including identity, sharp eyesight before and after correction with glasses owned by students, examination of the anterior segment, posterior segment of the eye, and questionnaires containing questions about the risk factors for refractive abnormalities.

The study was conducted in a rural junior high school in Badung Regency, Bali in June-August 2018.

The target population of this study is junior high school students in rural areas in Badung Regency, Bali.

The research sample was junior high school students in rural areas in Badung Regency, Bali who met the inclusion and exclusion criteria. The inclusion criteria were junior high school students in rural areas in Badung regency, Bali who were present at the examination, junior high school students in rural areas in Badung regency, Bali who were willing to take part in the research and sign informed consent. Exclusion criteria were junior high school students in rural areas in Badung Regency, Bali who were experiencing eye infections and did not fill out the questionnaire completely.

The sample in this study was selected through the stratified sampling technique. Sample selection begins with data collection and sorting of administrative areas at the village / kelurahan level in Badung Regency which is classified as a rural area based on BPS (Abiansemal and Petang) scoring. Primary schools in the two regions were recorded and random sampling was conducted by lottery to determine the sample of elementary schools. Based on this process, three junior high schools in Badung Regency were selected as samples, namely Petang I Petang, Petang II Petang, Petang IV Petang.

RESULT

Characteristics of research subjects can be seen in Table 1.

DISCUSSION

This research involved 222 students of SMP I, II, IV Petang where most of the students who took part in the study were female, namely 53,61% and the most age was 11-12 years, namely 29,27%.

This research is a preliminary study to determine the characteristics of refractive error that occur in junior high school students in rural areas (rural) in Badung Regency. The prevalence of refractive error in junior high school age children in urban areas is slightly higher than in rural areas . Urban areas prevalence ranges from 20-25%. Rural areas prevalence 12-15%.[9] This study found that the prevalence of refractive abnormalities in middle school children first in Badung Regency was 13,96% where 6,3% myopia, 1,8% myopia astigmatism simplex (MAS), 3,15% myopia astigmatism compositum (MAC), and 2,71% myopia and amblyopia.

Schools in rural areas tend to have outdoor extracurricular programs that are more diverse than schools in urban areas.[4,9,10] The large school area is also one of the protective factors to reduce the number of refractive error.[14,25] The use of gadgets such as laptops, computers, tablets is more numerous in schools in urban areas than in rural schools.[4,10] Students who were more often exposed to gadgets for a long time had higher refraction rates.[9,10]

This research shows that students of SMP I, II, IV Petang have more outdoor activities compared to close activities. Fifty-one percent of students do outdoor activities more than 4 hours a day. Forty-eight percent of students do close activities more than 3 hours a day. Outdoor activity is a protective factor for the occurrence of refraction abnormalities.[12,16]

Visual examination is divided into two according to WHO.[16,24] Un Corrected Visual Acuity (UCVA)

Table 1. Characteristics of Subject

Characteristic	Total (n)	Total (%)
Sex		
Boy	103	23,2 %
Girl	119	26,8 %
Age		
11-12 year	65	29,27 %
12-13	60	27,02 %
13-14	50	22,52 %
14-15	47	21,17 %
Un Corrected Visual Acuity (UCVA)		
No Visual Impairment	191	86,03 %
Mild Visual Impairement	25	11,26 %
Moderate Visual Impairment	6	2,71 %
Severe Visual Impairment	-	-
Best Corrected Visual Acuity (BCVA)		
No Visual Impairment	24	77,41 %
Mild Visual Impairement	7	22,58 %
Moderate Visual Impairment	-	-
Severe Visual Impairment	-	-
Diagnosis		
Emmetropia	191	86,03 %
Myopia	14	6,3 %
Myopia Astigmatism Simpleks (MAS)	4	1,8 %
Myopia Astigmatism Compositum (MAC)	7	3,15 %
Myopia + Amblyopia	6	2,71 %
Risk Factor of Refractive Error		
Outdoor Activity > 4 hour/day	115	51,81 %
Near Activity > 3 hour/day	107	48,19 %

and Best Corrected Visual Acuity (BCVA). UCVA visual examination is done without correction so that basic vision is obtained. Sharp inspection of BCVA vision is done with the best eyewear correction.

Refractive error is divided into five group (WHO) which is No Visual Impairment, where there is no sharp decrease in vision (6/6) in the blind eye with existing correction or with the best correction or pinhole; Early visual impairment (EVI) where sharp vision <6/12 - 6/18 is in the best eye with the existing correction or with the best correction or pinhole; Moderate visual impairment (MVI) where sharp vision <6/18 - 6/60 is in the best eye with the existing correction or with the best correction or pinhole; Severe visual impairment (SVI) where sharp vision <6/60 - 3/60 is in the best eye with the existing correction or with the best correction or pinhole; and Blindness where sharp vision <3/60 is in the best eye with the existing correction or with the best correction or pinhole.[17,25]

Two hundred and twenty two junior high school students I, II, IV Petang participated in this study and examined the anterior and posterior segments of the eyeball. Thirty-one children (13.96%) experienced refractive error consisting of myopia, MAS, MAC, and amblyopia. Twenty-four of them had used glasses and had optimal optimal vision (BCVA 6/6) using glasses. Seven of them have been wearing glasses and are included in the category of mild visual impairment (BCVA 6 / 20-6 / 7.5).

Most students who experience refractive abnormalities already have optimal vision sharpness. Characteristic data showed that in the UCVA group there were six students who were included in the category of moderate visual impairment. The BCVA group no longer found students who were included in the category of moderate visual acuity. Explanation of this shows that students who experience refractive error have examined themselves and get the help of glasses so that students have better eyesight.

CONCLUSIONS

The prevalence of refractive error in junior high school students in rural areas in Badung Regency is 13.96%. Thirty-one students out of 222 students who took part in the study were myopia, MAS, MAC, and amblyopia. Twenty-four of them had used glasses and had optimal optimal vision (BCVA 6/6) using glasses. Seven of them have been wearing glasses and are included in the category of mild visual impairment (BCVA 6 / 20-6 / 7.5).

Seventy-seven percent of students who use glasses have optimal vision sharpness after using glasses (no visual impairment).

Fifty-one percent of students do outdoor activities more than 4 hours a day. Forty-eight percent of students do close activities more than 3 hours a day.

Middle school students in rural areas do more outdoor activities than short-range activities. Outdoor activity is a protective factor for refractive abnormalities.

SUGGESTION

Further research needs to be carried out on the characteristics of refractive abnormalities in urban areas (urban) in Badung district, followed by a comparison of abnormalities in refractive abnormalities in rural areas (urban) and urban areas (urban) in Badung district. The prevalence figures that arise from this study can describe the situation

of refractive abnormalities in Badung regency. Badung Regency is one of the districts in Bali that has a high regional minimum wage (UMR), but eye health does not appear to be a health priority.

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