

Comparison Degree of Myopia in Senior High School Students in Urban and Rural Area

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DOI: 10.29322/IJSRP.8.5.2018.p7749

<http://dx.doi.org/10.29322/IJSRP.8.5.2018.p7749>

Abstract- Objective: To find out the comparison degree of myopia in senior high school students in urban and rural area

Method: This research is prospective observational with cross-sectional study, we observed 220 senior high school divided into 168 senior high students in urban and 52 senior high school students in rural area. Degree myopia of the all samples are observed.

Results: The most degrees of myopia is mild myopia 133 students (60.45%) in urban, and 32 students (14.55%) in rural. Began to suffer the myopia of 90 students (40.91%) during junior high school in urban and 24 students (10.91%) during senior high school in rural. History of family members with glasses is 49 students (22.27%) urban area and 17 students (7.14%) in rural area.

Conclusions: There was a difference between degree of myopia in senior high school students compare to urban area, but from the statistically there was no significant differences ($p > 0,05$). Progression of myopia tend to be increased so evaluation of myopia should be intense.

Index Terms- Myopia, Senior high school student, urban area, rural area

I. INTRODUCTION

Myopia is a form of refractive disorder in which the rays parallel to the line of sight in the unaccommodated eye state are focused in front of the retina. Myopia can occur because the size of the eyeball axis is relatively long. It can also be due to a high refractive index or due to refractive index of the lens and cornea too strong, this is called refractive myopia. Myopia usually occurs at the age of children (5-7 years), young age (7-16 years), and adults over the age of 16 years (> 16 years).^{1,2}

The prevalence of myopia is an increasing trend in the ages of children and adults. The prevalence of myopia in the United States at age 5 to 7 years is approximately 3%. While at the age of 8 to 10 years 8%, at age 11 to 12 years 14% and at the age of 17 years about 25%.¹ This also happened in Taiwan. The prevalence of myopia in children aged 6 years is about 12% and at the age of 16 to 18 years about 84%. This is also same found in Singapore and Japan.³

In Indonesia, visual impairment due to refractive disorder prevalence 22.1%, a problem that must be handled immediately. About 10% of the 66 million school age children (5-19 years old) suffer from refractive disorders. Myopia is the most refractive

error that encountered, at 86% of elementary school students, middle 95%, and senior senior high school 86%.⁴

Some of the risk factors causing myopia are genetic and environmental factors. Genetic factors are heredity, history of parents and siblings. Some environmental factors that affect the occurrence of myopia include close viewing activities such as reading books, writing, watching television, using computers, playing games, using mobile phones, and others. Activities far looking as playing and exercising outdoors can reduce the occurrence of myopia.

From Bei Lu study in China found condition of a region can affect the rate of myopia. Bei Lu study result that the increasing occurrence of myopia in rural areas of -0,5D. While in urban areas of Singapore increased myopia by -0,75D.⁵ The same study from Bella increased myopia in children in the urban of 0.83D, and in the rural of 0.61D. The study explains that the increase in myopia is higher in cities than in rural areas. This is because urban areas have more advanced technological and communication facilities, such as television, mobile phones, computers and video games. Thus encouraging more children to use viewing of close activity compared to remote viewing activities. While rural areas with a larger area and a Senior high school population. The development of technology and communication in rural areas is not as advanced in the urban.⁶ Based on the results study above, the aim of current study to observe the comparison of Degree of Mioipia in senior high school students in urban and rural area.

II. METHODS

This research was a prospective observational with cross sectional. Total sample of 220 senior high school students divided into 168 senior high students in urban and 52 senior high school students in rural area in April 2015. The study was conducted in accordance with ethical standards of Declaration of Helsinki and approved by Medical Faculty University of Sumatera Utara ethics committee. Degree myopia of the all samples are observed. All students were assessed visual acuity and done the correction of refractive error. Then assessed the degree of myopia.

III. RESULT

The research was conducted on April 1, 2015 until April 4, 2015. Located at Senior High School Negeri 2 Medan (urban) and Senior Senior high school Private Istiqlal School Deli Serdang (rural). We got 800 students as participant of research

consisting of 400 senior high school students in the urban and 400 senior high school students in the rural. There were 168 students (76.36%) who suffer from myopia in senior high school students in urban area and 52 students (23.64%) suffering from myopia in rural area.

Table 1
Distribution Students Suffered Myopia based to Origin of School

Participant	Myopia	
	N	%
Urban	168	76,36
Rural	52	23,64
Total	220	100,00

The highest number of female myopia patients in senior high school students in the urban were 114 students (51.81%), and 39 students (17.73%) in senior high school students in the rural.

Based on the distribution of age in senior senior high school students in urban suffered most myopia in the age group 16-17 years as many as 80 students (36.36%). While in senior high school students in the rural suffered most myopia in the age group 18-19 years as many as 23 students (10.46%). The mild degrees of myopia were found in 133 senior high school students (60.45%), as did 32 senior senior high school students (14.55%). Shows more father and mother glasses at senior high school students in the urban as many as 49 students (22.27%). While in senior high school students in rural more brother or sister as many as 17 students (7.73%).

At senior high school student in urban began to suffer from myopia most widely encountered as many as 90 students in junior high school (40.91%), in contrast to senior high school students in rural; suffer from myopia more since senior senior high school with 24 students (10.90%).

Based on the time distribution of senior senior high school students in the urban. Time group 1-2 hours at most used to read (do homework) as many as 117 students (53.18%). Group time of 3-4 hours is most used to watch TV as many as 53 students (24,10%). Group time > 4 hours at most used to use mobile phone as many as 75 students (34.00%).

Based on the time distribution of senior high school students in the rural. Time group 1-2 hours at most used to use computer as much as 35 student (15,91%). The 3-4 hour time group is most used to watch as many as 19 students (8.64%). Group time > 4 hours at most used to use mobile phone as many as 14 students (6.36%)

There are no significant numbers with the time spent reading, watching, using computers and mobile phone on increasing the degree of myopia in senior senior high school students in the urban and in the rural.

Table 1
Distribution Students Suffered Myopia based to Origin of School

Participant	Myopia	
	N	%
Urban	168	76,36
Rural	52	23,64
Total	220	100,00

Table 2
Distribution Senior high school Student Suffered Myopia in Urban and Rural based to Gender

Gender	Urban		Rural	
	N	%	n	%
Male	54	24,55	13	5,91
Female	114	51,81	39	17,73
Total	168	76,36	52	23,64

The highest number of female myopia patients in senior high school students in the urban were 114 students (51.81%), and 39 students (17.73%) in senior high school students in the rural.

Table 3
Distribution Senior high school Students Suffered Myopia in Urban and Rural based to Age

Age	Urban		Rural	
	N	%	N	%
14 – 15	69	31,36	18	8,18
16 – 17	80	36,36	11	5,00
18 – 19	19	8,64	23	10,46
Total	168	76,36	52	23,64

Based on the distribution of age in senior senior high school students in urban suffered most myopia in the age group 16-17 years as many as 80 students (36.36%). While in senior high school students in the rural suffered most myopia in the age group 18-19 years as many as 23 students (10.46%).

Table 4
Distribution Senior high school Suffered Myopia in Urban and Rural based to Degree of Myopia

Degree of Myopia	Urban		Rural	
	N	%	N	%
Mild	133	60,45	32	14,55
Moderate	30	13,64	18	8,18
High	5	2,27	2	0,91
Total	168	76,36	52	23,64

The mild degrees of myopia were found in 133 senior high school students (60.45%) in urban area and 32 senior high school students (14.55%) in rural area, moderate myopia in 30 senior high school students (13.64%) in urban area and 18 senior high school students in rural area, high myopia in 5 senior high school students (2.27%) in urban area and 2 senior high school students (0.91%) in rural area.

Table 5
Distribution Senior high school Suffered Myopia in Urban and Rural based to history of family with glasses

Family	Urban		Rural	
	N	%	n	%
Father	39	17,73	7	3,18
Mother	31	14,09	8	3,64
Father and Mother	49	22,27	5	2,27
Sister/ Brother	21	9,55	17	7,73
None	28	12,72	15	6,82
Total	168	76,36	52	23,64

The family history shows more father and mother used glasses found at senior high school students in the urban area for 49 students (22.27%), while in senior high school students in rural history of family especially brother or sister for 17 students (7.73%).

Table 6
Distribution Senior high school Suffered Myopia in Urban and Rural based to Onset Suffered Myopia

Onset Suffered Myopia	Urban		Rural	
	N	%	n	%
Elementary School	31	14,09	8	3,64
Junior high school	90	40,91	20	9,10
Senior high school	47	21,36	24	10,90
Total	168	76,36	52	23,64

At senior high school student in urban area began suffering myopia for 90 students (40.91%) from junior high school (40.91%), compare to senior high school in rural area 24 students (10.90%) began suffering myopia in senior high school.

Table 7
Distribution Duration of Time using for Reading/Doing Homework, Watching Television, Using mobile phone, Using Computer senior high school students in urban.

Time	Reading		Television		Handphone		Computer	
	N	%	N	%	N	%	n	%
1 - 2	117	53,18	96	43,63	46	21,00	89	40,45
3 - 4	41	18,64	53	24,10	47	21,36	41	18,64
>4	10	4,54	19	8,63	75	34,00	38	17,27
Tot al	168	73,36	168	76,36	168	76,36	168	76,36

Based on the time distribution of senior high school students in the urban. Time group 1-2 hours at most used to reading (do homework) as many as 117 students (53.18%). Group time of 3-4 hours is most using television as many as 53 students (24.10%). Group time > 4 hours at most using mobile phone for 75 students (34.00%).

Table 8.
Distribution Duration of Time using for Reading/Doing Homework, Watching Television, use mobile phone, Using Computer Senior Senior high school Students in Rural.

Time	Reading		Television		Handphone		Computer	
	N	%	N	%	N	%	N	%
1 - 2	31	14,10	30	13,64	20	9,10	35	15,91
3 - 4	16	7,27	19	8,64	18	8,18	11	5,00
>4	5	2,27	3	1,36	14	6,36	6	2,73
Tot al	52	23,64	52	23,64	52	23,64	52	23,64

Based on the time distribution of senior high school students in the rural. Time group 1-2 hours most using computer for 35 student (15.91%). The 3-4 hour time group is most watching for 19 students (8.64%). Group time > 4 hours at most using mobile phone for 14 students (6.36%)

Table 9.
Relation Between Time using for Reading (Doing Homework), Watching Television, Using Mobile Phone and Using Computer with Degree of Myopia in Senior high school in Urban and Rural

Time	Degree of Myopia						P
	n	X ± SD	n	X ± SD	n	X ± SD	

For Reading	165	2,25±1,52	48	2,07±1,14	7	1,57±0,79	0,380
For Watching	165	2,37±1,79	48	2,30±1,19	7	3,57±1,81	0,166
For Mobile Phone	165	1,85±1,78	49	1,33±1,59	7	1,86±1,46	0,187
For Use Computer	165	4,63±3,66	48	4,50±3,95	7	3,00±2,52	0,578

students in the rural use a lot of computers. In groups of 3 - 4 hours senior senior high school students in urban and in rural are equally widely used to watch television. In the time group > 4 hours, senior senior high school students in urban and in rural use mobile phones. Based on Anova test results, there is no significant relationship does not affect the increase in the degree of myopia with the length of time reading, watching TV, using computers and using mobile phone. Only as low as the degree of myopia longer the time to read, watch, use computers and mobile phone both in senior high school students in urban and in rural.

There are no significant differences in senior high school between urban and rural area from reading, watching, using computers and mobile phone from the degree of myopia ($P > 0,05$)

Based on the senior senior high school students in urban of 166 students (76.36%) and senior senior high school students in the rural were 52 students (23.64%). In this study, the comparison of myopia patients in senior senior high school students in the urban with the rural is 3.2: 1.

Based on gender in senior senior high school students in urban more female students 114 (51.8%) who suffer from myopia than male students 54 (24.50%), with a ratio of 2.1: 1. Similarly, senior senior high school students in the rural women 39 students (17.73%) and men 13 students (5.91%), with a ratio of 3: 1. This is in line with the study Bella, MG, et al, which is done on senior high school students in the urban of Padang by comparison 3,7: 1, in Anisa, S, et al study on Temanggung senior high school students with a ratio of 2.5: 1.^{7,8}

By age. senior senior high school students in urban are have greater incidence myopia in the age group 16-17 years as many as 80 students (36.36%), in contrast to senior senior high school students in rural have greater incidence in the age group 18-19 years as many as 23 students (10.46%).

Based on the degree of myopia, in senior senior high school students in urban have greater incidence is mild myopia as many as 133 students (60.45%). Similar with senior senior high school students in the rural have total of 32 students (14.55%) There is no comparison of degree of myopia in senior high school students in urban and rural. Although development of technology is further in urban area.

Based on the history of glassed family members in senior senior high school students in urban greater incidensce is the father and mother glassed as many as 49 students (22.27%). While in senior senior high school students in rural only 5 students (2.27%). In this study, senior senior high school students in urban of 28 students (12.72%) had no history glassed parent according to the Goss study, where the prevalence of myopia, 6% - 15% did not have myopia parents.⁹

Based on the onset of suffering myopia. In senior high school students in the urban began to suffer the most myopia since sitting in junior high school as many as 90 students (40.91%). And according to research conducted by Saerang, more junior high school students who suffer from myopia than elementary and senior senior high school students. While in senior senior high school students in the rural began to suffer myopia when sitting in senior senior high school as many as 24 students (10.90%).

Based on duration of expose to risk factor. In the time group 1 - 2 hours senior senior high school students inurban is widely used for reading, while in senior senior high school

IV. CONCLUSION

Patients with myopia are more often found in senior senior high school students in urban compared with senior high school students in rural. Genetic, long reading, watching TV and using computers as a risk factor in degree of myopia. So, examine of refractive should be done in children from primary school to protect the myopia

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