

THE DIFFERENCES OF MIOPIA RISK FACTORS ON MEDICINE STUDENT AND PYSHICAL, HEALTH AND RECREATION EDUCATION STUDENTS IN UNMUL SAMARINDA

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ABSTRACT

Introduction: Myopia is refractive abnormality which occurs when eyes are relax and the lights come in parallel, will be refracted at one point in front of the retina. The most significant risk factors for myopia are near work activities. In addition, spending time outdoors has been reported to reduce the risk of developing myopia. The research aimed to identify the differences of Risk Factors of myopia in Medicine student with Student of Physical Education, Medical and Recreation in University of Mulawarman Samarinda.

Methods: This research was an analytic observasional study with Cross Sectional research design. The research subject were 162 students consisted of 81 Medicine student and 81 Student of Physical Education, Medical and Recreation by using techniques stratified random sampling. Mann Whitney test was used to analyze the result of the research.

Results: The results of this research showed that 58 people (71.6%) were female and 19 years old as many as 28 people (34.6%) more commonly found in Medicine student that in Student of Physical Education, Medical and Recreation. The majority of students did near work activities which were not good at 77 people (95,1%) in Medicine student and 74 people (91.4%) in Student of Physical Education, Medical and Recreation. Good outdoor activities were more for Student of Physical Education, Medical and Recreation, which was 74 people (91.4%). 49 people (60.5%) had myopia with mild level as much 41 people (83.7%) in Medicine student. The different test showed a value $p=0.350$ for near work activities, and $p=0.000$ for outdoor activities and the frequency of myopia.

Conclusion: It can be concluded that there was no difference in near vision activities and there was a difference in outdoor activities and the frequency of myopia on Medicine student with Student of Physical Education, Medical and Recreation in University of Mulawarman Samarinda.

Keywords: Myopia, Near Vision Activities, Outdoor Activity

INTRODUCTION

Refractive disorders are conditions where firm shadows are not fzormed on the retina and an imbalance of the optical system in the eye results in blurred shadows¹. Myopia is a form of refractive disorder in which the rays coming parallel to the resting eye will be refracted at a point in front of the retina². The most common cause of visual impairment is uncorrected refractive disorder, followed by cataracts and glaucoma³. Of the existing refractive abnormalities, uncorrected myopia is the main cause of visual impairment⁴. The prevalence of myopia is high at

2.7% in 2000, in 2010 myopia prevalence was 28.3% and myopia prevalence was predicted in 2050 at 49.8%⁵.

The most important risk factors in the occurrence of myopia are family history and near vision activities such as reading, writing, using computers and mobile phones and playing video games⁶. Medicine students in Norway tend to experience myopia twice as much as most people in general⁷. In line with research conducted on students of the Faculty of Medicine of UIN Syarif Hidayatullah Jakarta, the prevalence of myopia is quite high at 62.50% with one of the factors influencing the frequent near vision activities (watching television, reading, habits using a computer / laptop, and playing videogames)⁸.

Physical activity is also called external activity which is something that uses energy to perform various physical activities such as walking, running, and exercising⁹. Research conducted on students of Sport Training Education Study Program at Yogyakarta State University shows that the value of physical activity is quite high on all subjects. The results of other studies indicate that the level of physical activity on Faculty of Medicine student is included in the category of low or mild physical activity¹⁰.

High physical activity or frequent outdoor activities are factors that can reduce the risk of myopia. Exercising outdoors, such as soccer, baseball, softball is also associated with a reduced prevalence of myopia¹¹. The lack of exercise intensity has the opportunity to accelerate the increase in the level of myopia 17.5 times compared to adolescents who are committed in exercising¹². This makes researchers interested in studying the differences of myopia risk factors, namely near vision activities and outdoor activities on Medicine students an Physical, Health, and Recreation Education students at Mulawarman University in Samarinda.

RESEARCH METHODS

This study was an observational analytic study conducted using a cross-sectional research method. This research was conducted in March-April at the Faculty of Medicine and the Teachers Training and Education Faculty of Mulawarman University. The sample of this study were students of the Medical Study Program and students of the Physical, Health, and Recreation Education Study Program at Samarinda Mulawarman University who met the inclusion criteria by taking a sample using stratified random sampling.

Research inclusion criteria included students of the Medical Study Program and the Physical, Health and Recreation Education Study Program class of 2015-2018 who were still active, age range from 18-24 years and were willing to become respondents. The data of this study are primary data obtained through examination of the correction of the contraction to find out the occurrence of myopia and questionnaire to find out the factor of myopia. Data will be analyzed using the Mann Whitney test.

RESULTS AND DISCUSSION

This research was conducted on the campus of the Faculty of Medicine and the Faculty of Teachers Training and Education in Mulawarman University with 81 respondents from the Medical Study Program and 81 students from the Physical, Health and Recreation Education Study Program at Mulawarman University using primary data taken from direct examination of refractive abnormalities and questionnaires that have been modified by researchers.

Characteristics of Respondents

Characteristics of research respondents based on gender found the highest number of male gender were Physical, Health, and Recreation Education students, as many as 59 people (72.8%), while the majority of female gender were Medicine students as many as 58 people (71.6%). Based on the age of the respondents, the majority age of Medicine students was 19 years, as many as 28 people (34.6%), while Physical, Health, and Recreation Education students were 21 years old, as many as 24 people (29.6%). The occurrence of myopia found that 49 Medicine students (60.5%) suffering from myopia with of 41 people (83.7%) currently were suffering a mild level myopia. The majority of Medicine students and Physical, Health, and Recreation Education students have near vision activities such as reading books, watching television, using laptops and gadgets/cellphones that fell into not good category, of 77 people (95.1%) of medicine students and 74 people (91.4%) at and Physical, Health, and Recreation Education students. Ad for outdoor activities, the majority of Physical, Health and Recreation Education students have good outdoor activities, as many as 74 people (91.4%).

Table 1. Characteristics of Respondents

	Medicine student		PE Students	
	N	%	N	%
Gender				
• Male	23	28.4	59	72.8
• Female	58	71.6	22	27.2
Umur				
• 18 years old	8	9.9	8	9.9
• 19 years old	28	34.6	18	22.2
• 20 years old	20	24.7	19	23.5
• 21 years old	17	21	24	29.6
• 22 years old	7	8.6	9	11.1
• 23 years old	1	1.2	3	3.7
Near Vision Activities				
• Good	4	4.9	7	8.6
• Not Good	77	95.1	74	91.4
Outdoor Activities				
• Good	12	14.8	74	91.4
• Not Good	69	85.2	7	8.6
Miopia Occurrence				
• Miopia	49	60.5	25	30.9
• Non-miopia	32	39.5	56	69.1
Miopia Level				
• Mild	41	83.7	19	76
• Moderate	6	12.2	6	24
• Severe	2	4.1	0	0

Analysis of the Differences of Myopia Risk Factors and the Frequency of Myopia Occurrence

Table 2 shows that the majority of Medicine students and Physical, Health and Recreation Education students at Unmul performed unfavorable near vision activities, as many as 77 people (95.1%) of Medicine students and 74 people (91.4%) of Physical, Health and Recreation Education students. The Mann Whitney test showed $p = 0.350$, means that there was no difference in the near vision activities from both groups. For the outdoor activities that are not good that is

equal to 69 people (85.2%) of Medicine students, while the majority of Physical, Health and Recreation Education students did good outdoor activities of 74 people (91.4%). The Mann Whitney test shows the value of $p = 0,000$ ($p < 0.05$) which means that there are differences in the outdoor activities between both groups. For myopia, 49 people (60.5%) of Medicine students experienced myopia and 25 (30.9%) of Physical, Health and Recreation Education students experienced myopia. The analysis was carried out with the Mann Whitney test and $p = 0,000$ ($p < 0.05$) means that there was a difference in the frequency of myopia occurrence between Medicine students Physical, Health and Recreation Education students at Unmul Samarinda.

Table 2. The Differences of Myopia Risk Factors and the Frequency of Myopia Occurrence

	Study Program		Total	%	P Value
	Medicine N(%)	PE N(%)			
Near Vision Activity					
• Good	4 (4.9)	7 (8.6)	11	6.8	0.350
• Not Good	77 (95.1)	74 (91.4)	151	93.2	
Outdoor Activity					
• Good	12 (14.8)	74 (91.4)	86	53.1	0.000
• Not Good	69 (85.2)	7 (8.6)	76	46.9	
Miopia Occurrence					
• Miopia	49 (60.5)	25 (30.9)	74	45.7	0.000
• Non-miopia	32 (39.5)	56 (69.1)	88	54.3	

The results of this study showed that there were no differences in near vision activities of Medicine students with Physical, Health, and Recreation Education students at Mulawarman University Samarinda. Since the majority did near vision activities with not good category such as reading, using mobile phones and laptops, and watching television in more than 2 hours with a distance of less than 30 cm. The analysis test showed there was no difference in near vision activities at the data with a $p = 0.350$ ($p > 0.05$). The results of this study are in accordance with research conducted by Retnosari in which it is found that 90% of students have the habit of doing near vision activities and only 10% of students who do not do near vision activities¹³.

Myopia risk factors that play the biggest role in myopia occurrences are near vision activities that are not good, such as spending a lot of time reading (more than 2 hours) or near vision activities without interspersed with rest after 30-40 minutes and reading distance that is too close i.e. < 30 cm and watching television is too close (less than 5 times the width of the television)¹⁴. Near vision activities is a contributing factor to myopia through direct physical effects due to continuous accommodation that causes the ciliary muscle tone to be high and the lens to become convex. The closer the distance will cause the stronger accommodation of the eye¹⁵. Research conducted on experimental animals found that working too often in close proximity can cause shadows to fall in front of the retina, causing blurred shadows. The increase in axial length of the eyeball is associated with less time spent outdoors which is <2 hours and longer time spent outside the room to study is > 2 hours¹⁶. Likewise, poor lighting is also a risk factor for myopia, because it can improve the response of accommodation to the eye due to the lack of light when doing close viewing activities¹⁷. In this study, the most near vision activity seen by medicine students and students of Physical, Health and Recreation Education in Unmul Samarinda was the use of mobile phones/gadgets for more than 2 hours without a break. Along with the current era of globalization, humans can not be separated from technology that functions as a modern communication tool, so

students use gadgets to support their daily activities such as searching for information by browsing, social media, chatting and playing games¹⁸.

The results of the analysis of outdoor activities show that there are differences in outdoor activities in Medicine students with Physical, Health, and Recreation Education students in Unmul Samarinda with $p = 0.000$ ($p < 0.05$). In this study, 74 people (91.4%) of Physical, Health and Recreation Education students did outdoor activities (outdoor sports, walking, playing or relaxing outside the house and relaxing in an open park) more than or equal to 2 hours and activities that are mostly done are outdoor sports, this is because students of Physical, Health, and Recreation Education often do outdoor sports practicum which is one of the courses that must be carried out. On the other hand, there were only 12 Medicine students (14.8%) who did outdoor activities in more than or equal to 2 hours because Medicine students carry out more lecture activities in the classroom and practicum in the laboratory.

This study is in line with the research of Febriany, Arimadyo, and Dhanardhono (2015) states that 95% of the group of students without myopia do outdoor sports while only 76.25% of the group of students who have myopia do outdoor sports¹⁹. The significance value was $p = 0.008$ ($p < 0.05$) means that it was a significant risk factor for myopia occurrences. Outdoor activities carried out for more than 2 hours a day had a lower proportion of myopia occurrences²⁰. The things included in outdoor activities are various kinds of activities carried out in open locations, both in learning, work, and play. Such outdoor activity is proven to reduce the prevalence of myopia because when outdoors, the field of vision will be wider and far away²¹. Recent outdoor activities are known as protective factors for myopia. A meta-analysis shows that the more time spent on outdoor activities is related to the smaller chance of getting myopia. Chances for myopia to fall by 2% for each additional hour spent outdoors per week²².

Epidemiological evidence shows that children who do more outdoor activities experience less myopia. This is due to the mechanism of the protective effect of ultraviolet light which stimulates the release of dopamine from the retina to inhibit the axial lengthening of the eyeball. Higher light levels outside the room will cause pupil constriction thereby increasing focus in viewing images or objects. In addition, accommodations on the eye will also be reduced because of further visibility when outdoors activities²³. When doing outdoor activities, vitamin D obtained from exposure to sunlight has a role in the formation of collagen in sclera²⁴. In accordance with David A. Goss's theory that the main factor of myopia is an increase in the axial length of the eyeball due to a decrease in the quantity and changes in the anatomical characteristics of the sclera collagen network²⁵. Increasing the time to perform outdoor activities will reduce the occurrence of myopia or effectively prevent the onset of myopia and slow the progression of the disorder refraction and farsightedness can be reduced by 0.30 D²⁶.

In this study, it is also found that Physical, Health, and Recreation Education students who experienced less myopia compared to Medicine students, this is because Physical, Health, and Recreation Education students did outdoor activities more frequently than Medicine students. This is in line with research conducted by Septiany and Setyandriana that the prevalence of myopia in outdoor activity groups is less than indoor activity and statistically shows a significant difference so that there is an influence of outdoor activity on the prevalence of myopia²¹. Likewise with Sofiani and Santik's research which stated that the lack of exercise intensity has the opportunity to accelerate the level of adolescent myopia as much as 17.5 times compared to adolescents who are diligent in exercising outdoors and adolescents who do not take time to walk will experience an increase in myopia diopters by 0.17 times¹².

In this study, the results showed that there were differences in the frequency of myopia between Medicine students with Physical, Health, and Recreation Education students in Samarinda Unmul, with the results of statistical analysis obtained $p = 0.000$ ($p < 0.05$). More medicine students experienced myopia, which were 49 people (60.5%) while Physical, Health, and Recreation Education students only 25 people (30.9%) suffered myopia. This study is in line with Hayatillah who reported that the prevalence of myopia on students of the Medicine Education Study Program at UIN Syarif Hidayatullah Jakarta was quite high at 62.50%⁸. This is because students of the Faculty of Medicine have a lot of material to master which requires students to read more. One of the risk factors for myopia is near vision activity such as reading for a long time with a distance that is too close²⁷. On the other hand, Physical, Health, and Recreation Education students at Unmul carry out outdoor activities more often such as outdoor sports which is one of the subjects, namely practicum. This is in line with research conducted in Yogyakarta that there is an influence of outdoor activities on the occurrence of myopia. The study reported that there were differences in the prevalence of myopia in people living in urban areas with people living in rural areas. People who live in villages do more outdoor activities so that they have a lower prevalence of myopia, which is 2.2% compared to people who live in urban areas that have a myopia prevalence of 31.6%²¹.

CONCLUSION

There is no difference in near vision activity between Medicine students and Physical, Health, and Recreation Education students at Unmul Samarinda and there are differences in outdoor activities and the frequency of myopia occurrences between Medicine students and Physical, Health, and Recreation Education students at Unmul Samarinda.

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