

ORIGINAL ARTICLE

CORRELATION BETWEEN COMPLIANCE OF SPECTACLE WEAR AND MYOPIA PROGRESSIVITY RATE IN MEDICAL STUDENTS OF DIPONEGORO UNIVERSITY**Syahriza Naufal Kingwijati¹, Arief Wildan², Andhika Guna Dharma², Trilaksana Nugroho²**¹Medical Student, Faculty of Medicine, Diponegoro University, Semarang²Staff of Ophthalmology, Faculty Of Medicine, Diponegoro University, SemarangEmail: naufalsyahriza@gmail.com**ABSTRACT**

Introduction: Myopia is a refractive error that causes images of distant objects to be focused in front of the retina by the non-accommodating eye. Myopia is one of the most common visual disturbances in the world. It is believed that the use of spectacle can reduce the progressivity rate of myopia. Spectacle can help light fall on the retina and prevent axial elongation of the eye. This theory needs to be investigated further so that it can be used as a reference. This study aimed to know the correlation between compliance of spectacle wear and myopia progressivity rate in medical students of Diponegoro University (UNDIP).

Methods: This research was an observational analytical study with cross-sectional design on 54 subjects ranging from 18 to 22 years old. Data are primary data obtained from questionnaires and objective eye examinations using an autorefractometer. The research was conducted from October to November 2021. Data were analyzed using Spearman Rank test which $p < 0,05$ was considered significant.

Results: The mean of compliance of spectacle wear and myopia progressivity rate in medical students of UNDIP are $(1,57 \pm 0,108)$ and $(0,259 \pm 0,515)$ dioptries respectively. The correlation between compliance of spectacle wear and myopia progressivity rate are $p = 0,082$ and $r = 0,239$.

Conclusion: There are no correlation between compliance of spectacle wear and myopia progressivity rate in medical students of UNDIP.

Keywords : Compliance, Spectacle, Myopia progressivity rate, Student

INTRODUCTION

Myopia, also known as near-sightedness, is a refractive error that causes the image of distant objects to be focused in front of the retina by the non-accommodating eye.¹ Myopia is one of the visual impairments with a high prevalence globally. In Indonesia, the prevalence of refractive error ranks first within eye diseases, which is as much as 25% of the population.²

A study showed that people with myopia tends to be experienced by young adults, and it becomes a serious eye health problem in Indonesia. Therefore, it is necessary to conduct further research on the progressivity rate of myopia among university students.

Medical students have a lot of learning activities, which require students to read textbooks or read journals more often. Medical students need these activities to help them in

their educational activities, such as classroom learning activities, discussions, clinical skills, and practicum. Therefore, the subjects in this study were medical students.

Lack of vision due to refractive error can be corrected by using corrective spectacle. In myopia, spectacle with the lowest negative spherical lens can be used to provide maximum visual acuity. Negative spherical lenses use the principle of scattering light, and therefore, if the refractive surface of the eye has too much refractive power as in myopia, this excess refractive power can be neutralised by placing the negative spherical lens in front of the eye.³

Using spectacle is expected to slow the progression of myopia. This occurs because the spectacle help the light fall precisely on the retina, so the eye does not have to look for accommodation and prevents axial elongation of the eye. Another theory also stated that light that falls right on the retina would help the eye nerves work, so the eye nerves will not be damaged quickly. Both theories are supported by a study in Malaysia that stated that myopic patients who were corrected using appropriate spectacle, experienced slower myopia progression than myopic patients who were corrected using poorly corrected spectacle.⁴

However, there are still lack of compliance of spectacle wear in the society. A previous study stated that several factors influence the compliance of spectacle wear, including gender, refractive status, level of knowledge, motivation, and parents level of knowledge.⁵

This study aimed to know the correlation between compliance of spectacle wear and myopia progressivity rate in medical students of Diponegoro University (UNDIP).

METHODS

This research was conducted in October-November 2021 at the eye clinic of Diponegoro National Hospital. The study used an analytical observational study with a cross-sectional approach. This study was conducted to prove the correlation between compliance of spectacle wear and myopia progressivity rate in medical students of UNDIP.

The sample was 54 medical students of UNDIP who met the inclusion and exclusion criteria. The inclusion criteria were the length of the sample's close-range activity ranging from 4-8 hours a day, the sample's position when doing close-range activities mainly were sitting, and the light intensity of the sample when doing close-range activities is enough. The exclusion criteria were subjects who declined to participate in the study. Using a questionnaire and an objective eye examination, sampling was done by consecutive sampling.

The independent variable was the compliance of spectacle wear. The dependent variable was the value of myopia progressivity rate in medical students of UNDIP. Compliance of spectacle wear was obtained from a questionnaire distributed to the sample. The compliance

was measured using a scale: always (spectacle wear 14-18 hours a day), often (spectacle wear 8-13 hours a day), rarely (spectacle wear 1-7 hours a day), and never (not wearing a spectacle). Myopia progression in this study is the increase of myopia degree that was obtained from lens measurement using a lensometer and corrective vision examination by an ophthalmologist or ophthalmologist assistant. Afterwards, the progression was calculated using the formula.

The obtained data were analysed statistically using the SPSS program. A descriptive test was carried out on each data, followed by a normality test performed using the *Kolmogorov-Smirnov* test. The hypothesis test used the *Spearman Rank* test because the obtained data were not normally distributed.

The research was conducted after obtaining ethical clearance from the Health Research Ethics Commission or Komisi Etik Penelitian Kesehatan (KEPK) of the Faculty of Medicine, Diponegoro University, The identity of the subjects was kept confidential, and all costs related to the research were the researcher's responsibility.

RESULTS

Descriptive analysis is done by looking at the frequency and distribution of data from each variable. Based on the data obtained from the subject, the characteristics of the research subject were obtained as follows:

Table 1. Characteristics of Subjects

Variable	F	%	Mean±SD	Median(Min-Max)
Age (years)			20,46±9,52	21 (18-22)
Gender				
Male	23	42,6		
Female	31	57,4		
Compliance of spectacle wear			1,57±0,10	1 (1-4)
Myopia progressivity rate			0,26±0,52	0,16 (0-2,25)

Table 1 shows the data of subjects' characteristics, including age, gender, compliance of spectacle wear, and myopia progressivity rate. The data shows the mean age of the subjects was (20.46±9.52) years. Subjects consisted of 23 (42.6%) males and 31 (57.4%) females. The mean value of compliance of spectacle wear was (1.57±0.10). The mean value of myopia progressivity rate was (0.26±0.52) dioptres with the lowest myopia progression 0 dioptres and the highest 2.25 dioptres.

Table 2. Correlation Test Results between Compliance Spectacle wear and Progression of Myopia

Variable	Myopia progression rate	
	p	r
Compliance of spectacle wear	0,082	0,239

Based on the *Spearman Rank* correlation test results in Table 2, there was no correlation between Compliance of Spectacle wear and myopia progressivity rate with $p=0.082$, where $p>0.05$.

DISCUSSION

The age distribution of subjects ranged from 18-22 years. This result follows a study conducted by Juanarta, which found that the highest prevalence of subjects suffering from myopia was in the young adult age (62.5%) and followed by older adults (23.9%).⁶ The majority of subjects were women with 31 people (57.4%), while male subjects were 23 people (42.6%). This follows a study conducted by Lestari, which found that women are more at risk of suffering from myopia than men.⁷

The distribution value of compliance of spectacle wear in this study was 1.57 ± 0.10 . The progressivity value of the subjects was distributed between 0-2.25 dioptres with an average of 0.26 ± 0.52 dioptres.

The results of data analysis using the *Spearman Rank* test showed that the significance value of compliance of spectacle wear with myopia progressivity rate was $p = 0.082$, and the correlation coefficient value was $r = 0.239$. This shows no correlation between the variable of compliance of spectacle wear and myopia progressivity rate in medical students of UNDIP.

These results are in line with a study by Nurwinda and Syarief, who found that there was no significant correlation between the compliance of spectacle wear and a person's level of myopia progression,^{8,9} but this study was in opposition with a study by Chassine, which suggests that optimal use of spectacle is vital for myopic patients to prevent myopia progression.¹⁰

This result occurs because this study had controlled several factors that can affect the progression of myopia, such as the duration of close-range activities, position when doing close-range activities, and light intensity when doing close-range activities. However, there are some factors that can affect the progressivity rate of myopia which could not be controlled in this study.

A factor that was not controlled in this study was the length of outdoor activity. A study in Bali conducted by French stated no clear evidence of whether outdoor activities can reduce

a person's progression. However, the theory that showed that outdoor activities could prevent myopia occurrences opens the possibility that outdoor activities can slow myopia progressivity rate.¹¹

This study also did not consider whether the sample wore under-corrected spectacle. A study conducted by Chung found that myopic patients who were corrected using appropriate spectacle experienced slower myopia progression than myopic patients who were corrected using under-corrected spectacle.⁴

Age is also an essential factor in the progression of myopia. The younger the onset of myopia, the faster the progression of myopia and the greater the degree of myopia. Myopia progression tends to stop in young adulthood, but in some young adults, slight myopia progression can be obtained.¹²

In young adulthood, myopia progression usually occurs due to pathologic myopia conditions. Generally, this condition is caused by cloudiness in the vitreous body or changes in the chorioretinal.¹³

The increase of intraocular pressure is also cited as one of the causes of myopia progression in young adults. The increase of intraocular pressure can cause stretching of the sclera, and over time the sclera becomes weak and can cause the eyeball to elongate. This elongation of the eyeball will result in the progression of myopia.¹⁴

This study also found confounding factors, namely the degree of myopia and the gender of the sample, that could not be controlled in this study. Both the degree of myopia and the gender of the sample could affect the variables of compliance of spectacle wear and the myopia progressivity rate. Further research is needed to see the effect of myopia degree and gender on the compliance of spectacle wear and the myopia progressivity rate.

Table 3. Frequency and Average Myopia Progressivity Rate of Compliance of Spectacle wear

Compliance of Spectacle wear	Frequency	Average Myopia Progressivity Rate
Always	32	0,15
Often	14	0.32
Rarely	7	0.625
Never	1	0

Other factors that might influence the results of this study are described in **Table 3**. In this study, samples who always and often compliance to wear spectacle dominated up to 85% of the total sample. The sample in this study was medical students who tend to have a better

knowledge of myopia than individuals in general. This unequal distribution of data could also be one of the factors why the results obtained were not following the initial hypothesis.

CONCLUSION

According to the study that has been done, it can be concluded that there are no correlation between compliance of spectacle wear and myopia progressivity rate in medical students of UNDIP. Further research are needed to include factors that can affect a person's level of compliance of spectacle wear and myopia progressivity rate.

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