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RESEARCH ARTICLE

Myopia Is Related to Head Pain in Students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara

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Abstract: Myopia was found to be a common cause of headaches, and about 28% of the patients studied had myopia. This study was conducted with the aim of finding out the relationship between myopia and headache in students with the target students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara. This study is an analytical observational research with a cross-sectional approach involving 72 research subjects of students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara, and using an online questionnaire with a Google form application to obtain primary data. Of the group of students who suffered from mild myopia, 23.5% suffered from mild headaches, 61.8% had moderate headaches, and 14.7% had severe headaches. Meanwhile, in the group of students who suffered from moderate myopia, 6.9% suffered from mild headaches, 58.6% moderate headaches and 34.5% severe headaches. For the group of students who suffer from severe myopia, no one experiences mild or moderate headaches, but there are 100% suffer from severe headaches. The Chi Square test shows the sum of 0.000. It can be concluded that myopia is related to headaches in medical students of the Universitas Muhammadiyah Sumatera Utara.

Keywords: Myopia, headache

INTRODUCTION

Myopia, or nearsightedness, is a common visual refractive disorder, where this condition is characterised by objects closer to the eye being visible and objects farther away being blurred.[1,2]

The World Health Organisation (WHO) estimates that 2.6 billion people of all ages in the world will have myopia in 2020, 312 million of whom are under the age of 19.[3,4]

Western countries like Europe have a myopia rate of about 40% while in South America.[5,6]

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Refractive abnormalities are often associated with frontal and/or occipital headaches [7,8]

Headaches are a somatic disease that is often associated with health problems in all age groups.[9,10]

A headache refers to pain or discomfort in the upper neck or head.[11,12] Headaches can vary in intensity and duration and can be accompanied by other symptoms such as sensitivity to certain lights, sounds, or smells.[13.14]

Headaches can occur as a result of prolonged eye strain caused by focusing on nearby objects, which could be one of the causes, including less time spent outdoors and more time spent on activities close to work, such as reading and using electronic devices.[15,16,17]

Tension-type headaches, migraines, and cluster headaches are different forms of headaches, each with its symptoms and triggers.[18,19,20]

The prevalence of headaches in adolescents varies based on characteristics such as gender, education level, and comorbidities.[21,22,23]

Proper treatment of refractive disorders, such as performing proper refractive corrections, can alleviate the symptoms of headaches in these patients [7,24,25]

Myopia was found to be a common cause of headaches, and about 28% of the patients studied suffered from myopia.[26,27]

With proper correction, 72.5% of people with refractive abnormalities and headaches were found to have improved their headaches, and 38% stated that they were completely healed.[28,29]

These people experience a much lower frequency of headaches, regardless of the type of headache.[30] Headaches in the frontal or occipital regions can be caused by refractive problems, including myopia, where 38% of people experience total remission of headaches, and 72.5% of individuals report that their headaches improve after undergoing refractive correction.[3,31]

Most of those who experience headaches develop untreated ametropia, including myopia [33]

After ametropia correction, 62.5% of children had a reduction in headaches after 4 weeks, and 75% had reduced symptoms after 8 weeks.[3,34]

Myopia and hyperopia are refractive disorders that can contribute to the development of asthenopia symptoms, including headaches [35]

Eye-related symptoms, such as dry eyes and strained eyes, are common in individuals with myopia, and these symptoms can also be associated with headaches.[36] Long-term use of digital screens is a potential risk factor for the development of myopia, which is associated with an increased risk of headaches, and this leads to eye discomfort. Vision can become blurry, especially for close-up work, and then headaches will occur.[36,37]

The mechanism of headaches can vary, depending on the underlying cause and individual factors.[38]

Refractive disorders, such as myopia, can cause headaches due to excessive

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accommodative needs and the need to squint to see clearly, causing strain (spasm) on the visual system [39]

Accommodative spasms usually occur in young patients and cause eye pain, myopia, and miosis when doing close work, so comprehensive management is needed to manage the headaches caused by such myopia.[39]

This study was conducted to find out the relationship between myopia and headache in students with the target of students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara.

METHOD

This study is observational analytical research with a cross-sectional approach involving 72 research subjects of medical students of the University of Muhammadiyah, and using an online questionnaire with a Google form application to obtain primary data.

RESULT

Table 1. Demographic Characteristics of Respondents

Age (Y.O)	Frequency (n)	Percentage (%)
17	3	4,2
18	10	13,9
19	37	51,4
20	9	12,5
21	5	6,9
22	6	8,3
23	2	2,8
Total	**72**	**100**
Gender		
Man	21	29,2
Woman	51	70,8
Total	**72**	**100**

Table 2 Distribution of Respondent Characteristics by Risk Factors

	Frequency (n)	Percentage (%)
Always wear glasses		
Yes, always	47	65,3
Not always	25	34,7
Total	**72**	**100**
Duration of use of gadgets		
Above 3 hours	70	97,2
Under 3 hours	2	2,8
23 Years	2	2,8
Total	**72**	**100**
Sleep Duration		
Less than 8 hours	52	72,2

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≥ 8 hours	20	27,8
Total	**72**	**100**

Table 3. Distribution of respondent characteristics by degree of myopia and headache

	Frequency (n)	Percentage (%)
Degree of Headache		
No Pain	0	0
Light	10	13,9
Heavy	38	52,8
Total	**24**	**33,3**
Degree of Myopia	72	100
Mild	34	47,2
Moderate	29	40,3
Savere	9	12,5
Total	**72**	**100**

Table 4. Results of Analysis of the Relationship between Myopia and Head Pain in Students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara

Myopia	Headache			Total	P Value
	Mild	Moderate	Savere		
	n (%)	n (%)	n (%)	n (%)	
Mild	8 (23)	21 (61,8)	5 (14,7)	34 (100)	
Moderate	2 (6,9)	17 (58,6)	10 (43,5)	29 (100)	0,000
Savere	0	0	9 (100)	9 (100)	
Total	**10 (13,9)**	**38 (52,8)**	**24 (33,3)**	**72 (100)**	

DISCUSSION

The characteristic data obtained by gender showed the most in the female gender, in line with research conducted at Pertamina Bintang Amin Hospital, which also had more results in the female gender than in men, who had a lot of myopia. Women who experience myopia due to their lifestyle and environment are rarely exposed to sunlight. Sunlight itself is needed for the accommodation of the eyes and the refraction of light on the retina. With sunlight, the eyes get enough light to train the ability to capture the shadow, to is reflected [30]

Other studies also state that female students are more likely to suffer from myopia. This is because women have fewer outdoor activities than men, so women have a greater risk of myopia than men. Outdoor activities such as sports can provide more light intensity so that eye elongation can reduce the risk of myopia.[29,31]

Related to age, in adulthood, myopia usually persists, and in old age, there is usually a decrease in the prevalence of myopia to hypermetropia or near Wednesday (difficulty reading at close range). Myopia in childhood can occur, but its appearance in childhood has not settled

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because the growth of the eyeball can still change. One theory explains that the prevalence of myopia in adults is caused by changes in the lens refractive index, namely lens refractive index increases with the increase in the turbidity of the lens core, this is due to changes in the components of the eyeball which will eventually result in a change in the refractive status to myopia. The age factor with myopia is related to the strength of accommodation, which will increase according to needs, so that the closer the object is seen, the stronger the eyes accommodate, and the accommodation decreases with age.[30,31]

Based on the duration of gadget use, in this study, it was found that most students used gadgets for more than 3 hours. This is in line with a study in Makassar that researched students of the Faculty of Medicine and found that the characteristics of the duration of use of gadgets were the most at 2-4 hours (60.2%) and more than 4 hours (35.2%). Excessive use of gadgets will result in eye fatigue because the eyes focus on objects at close quarters for a long time, and the eye muscles work harder to see objects, especially if they are accompanied by less lighting. Less lighting will result in the eyes being stronger to accommodate when looking at an object. This occurs due to the contraction of the ciliary muscles in the eyes. As a result of the accommodation, the refractive power of the lens will increase and become more convex, resulting in myopia.[32,33]

Sleep duration in this study was most common in students who had less than 8 hours of sleep. Another study that examined the risk factors for the occurrence of myopia found that 59.35% had a lack of sleep duration (1 which means that the degree of relationship is positive between independent variables and dependent variables (risk factors). Vision that cannot be properly focused by the eye on the retina causes blurred vision, so that the shadows formed are not clear. Unclear shadows are caused by refractive abnormalities and improper corrective glasses and settings.[34]

Nearsightedness or myopia is a visual condition that, when looking at a close object, will be seen clearly, but when looking at a distant object, it appears blurry. Myopia occurs when the eyeball is too long or the cornea is too convex, as a result of which the light entering the eye is not focused right on the retina, and distant objects appear blurry. Myopia is a health problem whose prevalence has been increasing in the last 50 years. It is estimated that 1.6 billion humans are affected by myopia, and it is likely to increase to 2.5 billion by 2020. The prevalence and incidence of myopia depend on age, gender, race, ethnicity, occupation, environment, and other factors. The prevalence of myopia in adults in the Americas is currently 20-50% and in some Asian countries, the prevalence is around 85-90%. The prevalence of myopia in children–in Western countries is very small (less than 5%), while children in Asia have a high prevalence of about 29%.[35]

The study examined the symptoms complained of and refractive abnormalities in the form of myopia obtained the results of a single symptom of rapid eye fatigue

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having the highest sensitivity (77.05%), a single symptom of a changing body shape had the highest specification value (98.04%), a single symptom of eye pain had the highest positive conjecture value (31.96%), and the symptom of a single eye that tired quickly had the highest negative conjecture value (99.05%). Meanwhile, from the combination of 2 symptoms, the symptoms of rapid eye fatigue and eye pain had the largest sensitivity value (40.98%), the symptoms of rapid fatigue and the shape of the object, the eyes quickly tired and headache, as well as eye pain and the shape of the object changed both had the largest specialization value (99.96%), the symptoms of eye pain and headache had the largest positive value (95.45%), and eye symptoms of rapid fatigue and eye pain had the largest negative conjecture value (98.61%). It can be concluded that 95.45% of respondents who experienced a combination of these symptoms really experienced eye refractive abnormalities from all positive screening results carried out, and respondents who had refractive abnormalities and complained of eye fatigue and headache had very high scores (99.96%). Some of the symptoms that can be used as predictors of eye refractive disorders and their severity are eye fatigue quickly, changes in the shape of objects, eye pain, and headaches after looking at objects for a long time. Some of these symptoms can be influenced by several factors, including too many close-looking activities, such as reading books, looking at computer screens, playing video games, and watching television. This can lead to weakening of the ciliary muscles of the eye, resulting in muscle vision to see far away.[36]

The results of this study are also the same as a study conducted in South Africa that examined the relationship between headaches and refractive disorders. Temporal and frontal headaches are the most common headache locations. Temporal headache is significantly more common in anisometropia, mild hyperopia, myopia and astigmatism. There were also significant results between mild myopia, mild hyperopia and astigmatism with headache (p=0.003). Headaches in myopia occur due to excessive squinting, where the forehead and eyelids are narrowed in an attempt to narrow the palpebral fissure and use the pinhole effect to see better.[37] Research conducted on students of the Faculty of Medicine, Sam Ratulangi University in the city of Manado found that most students (72.84%) of the class of 2013 experienced tension headaches and as many as 64.61% experienced swelling in their eyes. Most of the students experience complaints about their eyes, namely dry eyes, collar eyes and blurred vision related to the use of smartphones daily. One hypothesis about how headaches may be related to smartphone use is that smartphone displays placed too low can increase the load on the neck muscles, and smartphone use > 56 hours/week prevalence ratio significantly increased for neck pain or shoulder pain, and eye fatigue is associated with headaches. The various features provided by smartphones make their users spend a lot of time interacting with the phone screen. Using a smartphone for too long causes

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various negative impacts on its users, such as creating an addiction that impacts less physical activity, disrupts sleep, and harms the eyes [38]

Of students who use distance learning, 43% experience blurry eye complaints and 68% experience headache complaints. Respondents in this study had an average age of 19 years, or a late teenage group. When viewed from a gender perspective, men often experience red eyes and burning in the eyes, while women often have headaches and neck and shoulder pains. The complaints felt by the respondents were caused by distance learning using computers, so the duration of staring at the computer in one day was >2 hours. When used, the computer will illuminate the face, including the user's eyes. If the room is dark, the user will turn on the lights so that the lights also illuminate and reflect light on the eyes. This prolonged exposure to light also eventually causes problems, ranging from itching and burning in the eyes, to headaches, shoulder pain and others. In addition, the lack of rest time also makes the eyes even more strained.[39]

CONCLUSION

From the results of this study, it can be concluded that there is a relationship between myopia and headache in students of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara.

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