

The Relationship Between Cycling Duration and the Level of Knee Pain Complaints and Function in the Elderly: A Study on Members of the An-Nur Lasem Cycling Club

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ABSTRACT

Introduction: Cycling is categorized as a sport that is favoured by all people because this sport is very easy and simple. Knee pain is the main complaint that often affects the elderly because of the degenerative phase. In the Lasem City area, Central Java, there is the An-Nur elderly bicycle community, the majority of whose members are elderly and complain of pain in the knee area after cycling, that's why researchers want to do this research. The research was carried out to find out whether there is a relationship between cycling duration and functional and knee pain. **Methods:** This type of research is quantitative observational with a cross-sectional study design. The total sample in this study was 16 people who met the inclusion and exclusion criteria. The results of statistical tests using Chi-Square obtained a p-value of 1.000 for knee pain and 0.551 for functional. **Results:** The results obtained from this study are that there is no significant relationship between cycling duration and knee pain and function. **Conclusion:** There was no significant relationship between the relationship between cycling duration and knee pain and functionality.

Keywords: Cycling, Knee Pain, Functional knee

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INTRODUCTION

Individuals who have reached the age of over 60 years can be said to be elderly, the process of human development from infancy, childhood, adolescence, adulthood to old age, this process is a natural thing in human life and will certainly be experienced by everyone, the older you get, there will be physiological changes in the human body. There are several changes, namely the nervous system, musculoskeletal, hearing and vision. (Sholekah Lia Aryanti et al. 2022)

According to the World Health Organization (WHO), the elderly are 60 years or older. Pre-elderly are very susceptible to declining physical quality, at this age, they will experience a degenerative phase where there are changes in anatomical structure to decreased functionality so many elderly people complain of pain in the lower extremities, especially in the knees. Elderly is

identical to decreased body function. Generally, symptoms of aging begin at age 45 and problems arise at around 60 years. This decline in body function includes several aspects, including decreased strength by 88%, reduced vision function by 72%, decreased body flexibility by 64%, decreased memory by 61%, decreased hearing by 67% and decreased sexual function by 86% (B. Utomo 2010; Wahyuni & Zakaria 2021).

The annual prevalence of knee pain in the global population is reported to be 22.7%, with adolescents having a prevalence of 28.9%. Military recruits have an incidence rate of 9.7-571.4/1,000 person-years, novice runners in the overall population have an incidence rate of 1080.5/1,000 person-years, and early adolescent amateur athletes have an incidence rate of 5.1%-14.9% over a season. In comparison, in one study,



the point prevalence in the military population was 13.5%. (Baylan et al. 2020)

Knee pain is a pain in the knee joint that can be experienced by everyone due to excessive activity. Knee pain is an uncomfortable feeling and only the person who experiences it can explain the feeling. Knee pain can be caused by several factors, such as osteoarthritis, meniscus injury, knee sprain and others. (Lestari 2022)

Cycling is one of the sports that is popular with the whole community because this sport is very easy and simple, by relying on a bicycle, this sport can be done. The purpose of cycling is to exercise and maintain health. The benefits of this sport are to increase endurance so that it is not easily exposed to diseases that attack the body's immunity, relieve stress, make you lose weight, and much more (Nurrahmah et al., 2021). The right effective time to do cycling is in the morning because the air in the morning is still clean and can increase the body's metabolism. (Abdul Rahman Saleh & Nurhayati 2014).

METHODS

This research method is observational analytic with cross-sectional design. This research was conducted in Lasem City, Lasem District, Rembang Regency, Central Java. This research has obtained ethical feasibility from KEPK RST Dr. Soedjono Magelang No. 80.7 / C.8-III / FIK / II // 2023. The research was conducted on Saturday, January 28, 2023.

The population in this study were 25 members of the AN-Nur Lasem elderly cycling club with physiotherapy examinations on members of the An-Nur Lasem elderly cycling club. The sample was taken using a purposive sampling technique, namely sampling with special considerations. These special considerations are the inclusion and exclusion

criteria. The inclusion criteria are that the elderly are willing to be research subjects, are over 60 years old and are cooperative while being respondents. The exclusion criteria are the elderly who feel pain when cycling, the elderly who have other disorders that are risk factors for decreased body activity and poor conditions such as weakness, shortness of breath and others. After sampling with consideration of the inclusion and exclusion criteria, a sample of 16 people was obtained.

The independent variable in this study was the duration of cycling and the dependent variables were knee pain and functional. The duration of cycling is a cycling sport that has been done for 5 years or more. Measured using a questionnaire from KOOS. Knee pain is a pain in the knee joint that can be experienced by everyone due to excessive activity. Knee pain is an uncomfortable feeling and only the person who experiences it can explain the feeling. Knee pain can be caused by several factors, such as osteoarthritis, meniscus injury, knee sprain and others (Kesehatan et al., 2022), knee pain is measured using the NRS (Numeric Rating Scale) measuring tool. Functional ability is a process to determine the patient's ability to perform specific activities about daily life routines that are integrated into their activity environment. Functional ability is measured using the KOOS Questionnaire measuring tool.

RESULTS

Research Result

This study used subjects or samples that had met the following criteria: all members of the An-Nur Lasem elderly bicycle club who were over 60 years old, 16 people with a population of 25 people. All respondents were male.



Table 1. Research Results on Respondent Characteristics

Characteristics	Sub-group	F (%)	Average
Age	60 – 65	6 (37,50%)	67,63 Years
	65,1 - 70	5 (31,25%)	
	70,1 – 75	4 (25%)	
	75,1 – 80	1 (6,25%)	
Body Mass Index	Underweight	5 (31,25%)	21,75kg Normal
	Normal	2 (12,5%)	
	Overweight	8 (50%)	
	Obes	1 (6,25%)	
Pain	0	0 (0%)	3 Mild Pain
	1-4	12 (75%)	
	5-6	4 (25%)	
	7-10	0 (0%)	
Functional	Good	15(93,75%)	80,62 Good
	Bad	1 (6,25%)	
Cycling time	Long (years)	4 (25%)	5 Years
	Not long	12 (75%)	

In the table 1, it can be seen that all respondents are male members of the An-Nur elderly bicycle club from the total number of respondents in the study (16 people). The majority of respondents are on average 60-65 years old, 6 people (37.50%). The minimum age is 61 years and the maximum age is 77 years. The largest age is 66 years old, 3 people.

The majority of respondents with underweight body mass index were 5 people (31.25%) because the BMI results were less than 18.5. There were 2 normal respondents (12.5%) because the BMI results were between 18.5 and 22.9. There were 8 overweight respondents (50%) because the BMI results were between 23 and 29.9. There was 1 obese respondent (6.25%) because the BMI results were more than 30.

Most respondents who felt mild knee pain were 12 people (75%). While there were 4 respondents (25%) who felt moderate pain. The average result of knee pain was 3, which means mild pain.

The majority of respondents have good functional ability as many as 15 people (93.75%). While 1 person (6.25%) of respondents have poor functional ability. The average functional ability results were 80.62% or good.

The majority of respondents who have been cycling for a long time were 4 people (25%). While 12 people (75%) of respondents have not been cycling for long. The average length of cycling (years) was 5 years, which means between long and not long cycling.

Statistical test

In Table 2, the chi-square test results show that the Asymp. Sig. (2-tailed) value is 1,000, where the value is >0.05, so the data on the relationship between cycling duration (years) and knee pain is not significantly related, because the chi-square test result value is >0.05. In this test, there are several categories, namely the duration of cycling categorized as mild pain is 3 people, and the moderate pain category is 1 person. While those who do not cycle for a long time, namely not cycling which is categorized as mild pain, there are 9 people, the moderate pain category is 3 people.

In Table 3, the chi-square test results show that the Asymp. Sig. (2-tailed) value is 0.551, where the value is >0.05, so the data on the relationship between cycling duration (years) and function is not significantly related, because the chi-square test result value is >0.05. In this test, there are several categories, namely the duration



of cycling which is categorized as good functional is 4 people. Those who do not cycle for a long time, namely not cycling for a long time, which is categorized as good functional, there are 11 people, and the poor functional category is 1 person.

In Table 4, it can be seen that the chi-square test has an Asymp, Sig. (2-tailed) value of 0.383,

where the value is >0.05 , so there is no significant relationship between body weight and knee pain data.

In Table 5, it can be seen that the chi-square test has an Asymp, Sig. (2-tailed) value of 0.696, where the value is >0.05 , so there is no significant relationship between body weight and functional data.

Table 2. Relationship between Cycling Duration (Years) and Knee Pain

Cycling Time	Pain				Total Number	Chi-Square Result
	No Pain	Mild Pain	Moderate Pain	Not Severe		
Long	0	3	1	0	4	1,000
Not long	0	9	3	0	12	
Amount	0	12	4	0	16	

Table 3. Relationship between Cycling Length (Years) and Functional

Cycling Time	FUNCTIONAL		Total Number	Chi-Square Result
	Good	Bad		
Long	4	0	4	0.551
Not long	11	1	12	
Amount	15	1	16	

Table 4. Relationship between Body Weight and Knee Pain

Body Weight and Knee Pain	Value	df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	0.762	1	0.383
Likelihood Ratio	1.243	1	0.265
Linear-by-Linear Association	0.714	1	0.389
N of Valid Cases	16		

Table 5. Relationship between Body Weight and Functional

Body Weight and Functional	Value	df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	0.152	1	0.696
Likelihood Ratio	0.267	1	0.599
Linear-by-Linear Association	0.143	1	0.705
N of Valid Cases	16		

DISCUSSION

Respondent characteristics

At the age of over 60 years can be categorized as elderly. The elderly are very susceptible to declining physical quality. At this age will experience a degenerative phase where the ability of tissue and cells in the body decreases. In this phase, the knee joint pads will experience thinning and peeling of the joint cartilage so that when there is pressure or friction on the joint surface it causes pain due to collisions between bones and bones that can irritate the nerve endings on the joint surface. This also makes the joint space narrower which causes the bones in the joints to rub against each other then causing pain, swelling difficulty in moving and also pain.

Based on the results of the study, the results were obtained at the age of 60-80 with an average age of 67.63 years. The prevalence of radiographic knee OA has been studied in 2282 Japanese elderly aged ≥ 60 years (817 men and 1,465 women) living in urban areas. The prevalence of radiographic knee OA is high. The prevalence of knee pain depends on age in women, but not in men. (Misra et al. 2019)

Body mass index (BMI) is a simple measure of weight for age that is used to classify obesity. Overweight or excess weight and obesity are factors that accelerate degenerative factors in joints, especially the knee joints. The main risk

factors for degenerative diseases are unhealthy diet, lack of physical activity, consumption of Expert System for Diagnosing Degenerative Diseases 21 cigarettes, and increased stress and exposure to causes of degenerative diseases. (Kim et al. 2021)

To calculate body mass index, you can calculate it yourself or use an application that provides an ideal body weight calculator. The formula for calculating body mass index manually is body mass index (BMI) = body weight (kg): height (m). If the calculation result is less than 18.5, it means you are underweight or low. If the body mass index is between 18.5 - and 24.9, it indicates normal conditions. If it is at 25 - 29.9, it means you are overweight or overweight. Meanwhile, if the result is above 30, it indicates obesity (Acces 2021)

Cycling for a long time with excess weight increases the load when pedalling the bike so that knee pain appears and functional ability decreases over a longer period. Decreased walking speed to reduced functional ability in obese people are caused by decreased muscle mass due to the accumulation of fat tissue.

Based on this study, the results showed that the majority of members of the An-Nur Lasem elderly bicycle club had an average BMI of 3, which means normal.

Knee pain is a major complaint that often attacks the elderly due to the degenerative phase.



The pain that appears usually gets worse when doing heavier and longer activities and decreases when resting. Complaints of pain last a long time and develop slowly. Cycling is a type of heavy activity that requires great energy when pedalling, especially by members of bicycle clubs who travel long distances and long times. This can trigger complaints of knee pain considering that respondents have entered the elderly age. (Keogh et al. 2018). Based on the study, the results showed that the majority of members of the An-Nur Lasem elderly bicycle club experienced mild pain.

Functional activity is a description of the patient's ability to perform functional activities in daily life such as walking, sitting, lifting, squatting, sleeping and others. Excessive activity and excessive exercise can cause decreased functionality and cause one example of knee pain. Knee pain that attacks the elderly for a long time will reduce functional ability as a result of which they will experience limitations in moving and doing daily activities. (Fatmawati 2021)

Based on the study, the results showed that the majority of members of the An-Nur Lasem elderly cycling club were functionally good.

The duration of physical exercise is carried out for at least 30 minutes with moderate intensity, 5 days a week or 20 minutes with high intensity, 3 days a week, or a combination of 20 minutes of high intensity 2 days a week and 30 minutes with moderate intensity 2 days a week. (Kuniano 2015). The duration of cycling (years) can be categorized as the duration of cycling because they have been doing cycling sports activities for more than 5 years, which will trigger knee pain. (Pohan & Sugandi 2019).

Relationship between duration of cycling and level of knee pain complaints in elderly cycling club members

Based on the results of the analysis in this study, there is no significant relationship between the duration of cycling and knee pain in members of the An-Nur elderly cycling club, because the results of the chi-square test value are 1,000 or >0.05 . This is not in line with the research conducted by Randez Rahdian Aziz (2021) that

there is a relationship between cycling and knee pain.

Other factors could be a relationship, such as cyclists who have a history of previous illnesses, diet, obesity (BMI) and others. (A. W. Utomo 2020)

Incorrect cycling position can also cause injury and discomfort and can greatly affect the control of the bike. Several measurements determine the correct setup: frame size, saddle height, knee angle, handlebar height and reach. Measurements vary from person to person and are based on body type and size, the type of cycling you want to do, and past or present injuries. Bike setup is done in several steps, so don't expect to get the perfect setup the first time you try it. Sometimes it takes a series of adjustments to make your bike more comfortable and efficient and it can take weeks or months to get the right position. Saddle height is the most important adjustment for achieving muscle efficiency when pedalling. Setting the saddle to the correct height will help the leg muscles function to their maximum strength, and will minimize the force on the buttocks, which will prevent injuries. Adjust the saddle height so that when sitting perfectly on the saddle, with your heels on the pedals, your legs are fully extended. This ensures that the knees are slightly bent when the toes are on the pedals with the cranks in the vertical downward position. (Zhanssen et al. 2021)

Relationship between cycling duration and function in elderly cycling club members

Based on the results of the analysis, it was found that the relationship between the duration of cycling and function in members of the An-Nur elderly cycling club was not significantly related because the chi-square test result was 0.551 or >0.05 .

Other factors may be complementary that make the results have a relationship, for example, heavy activity, lack or rarely doing sports, history of previous illnesses, work or other activities besides cycling that can trigger functional disorders. (S et al. 2019).



CONCLUSION

Based on the results of the data analysis, it was concluded that there was no significant relationship between the relationship between cycling duration and knee pain and functionality. Where the value of the relationship between cycling duration and knee pain and functionality is less than 0.05. For researchers who want to conduct further research related to this research topic increase the number of population and larger respondent samples so that the research results have a wider scope. Research suggestions that can be conveyed by respondents are expected to be able to carry out cycling activities that are not too excessive and not too far.

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